MISTRA
The Swedish Foundation for
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Background paper

Societal structures for climate change mitigation

February 2020

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The contents of this background paper are the responsibility of the authors.

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Background and Mission

According to the statutes of Mistra, research funded by the foundation should "promote the development of strong research environments of the highest international class with importance for Sweden's future competitiveness". The research should find solutions to important environmental problems and enhance the sustainable development of society. The funding call to be developed by Mistra will be based on this background paper and analysis of the current state of the art of research and knowledge needed to support societal structures for climate change mitigation. The Terms of Reference for the expert group included:

- to give a general overview of the state-of-the-art in the area, internationally
- to provide conclusions and recommendations to Mistra on scope and characteristics for a new research programme
- to draft concrete details regarding the orientation for a future call for funding, maximum one page (that could be used as part of the actual call text)

For a full description of the assignment, See appendix A1.

The expert group met in Stockholm during January 20-22, 2020 to formulate the key research questions. The field is complex and bringing these different areas into one discussion is a challenge in its own. Thus, the background report should not be read as a thorough assessment of the status of the field, or the respective fields. It strives to identify relevant and worthwhile future research focus areas and themes for a potential forthcoming Mistra programme on "Societal structures for climate change mitigation".

Introduction

The purpose of this background report is to suggest a basis for a future call on relations between societal structures and emissions of greenhouse gases in a broad sense. The report encourages proposals for programs not only investigating current state-of-the-art, but also digging deep into possible societal transformations and how those transformations could be related to equality in society. Equality is relevant both in terms of how negative effects on equality can be avoided in a transition towards climate mitigation, and in terms of positive and negative potential relations between equality and total emissions of greenhouse gases from all activities in society.

The report serves as a background report for Mistra, aiming at one excellent major research program in support of a transformation of societal structures in an environmentally strategic direction, focusing on emissions of greenhouse gases, but also acknowledging the importance of total extraction of natural resources and social effects in Sweden and globally.

This background report lays the foundation for the call, and identifies a number of focus areas for the future research program. They are all of high importance for how society develops. There are other forces in society that may be equally strong and important, but the set of focus areas described in this report is defining this particular call. This report focuses on the importance of eliminating greenhouse gas emissions and on not increasing inequalities when doing so. The Sustainable Development Goals include those two important targets, but adds a number of other goals. Even though other SDG:s are not explicitly highlighted, they are still of relevance, and should be considered when appropriate.

Climate change might be the greatest environmental challenge to current society. Accordingly, the question about how to plan a future society which encourages a way of living that does not include net emissions of greenhouse gases, may be the most important question for a research agenda. Changing society towards no-net greenhouse gas-emissions, requires profound changes. In those changes, consideration must be taken also to effects on other environmental parameters and to social changes of society. This broad objective requires involving a multidisciplinary or even interdisciplinary collaboration.

In Sweden there is a long and strong history of planning societal structures. One important contribution is the way Sweden became a pioneer in building a universal welfare state that led to a significant reduction of inequality without losing the objectives of economic stability and entrepreneurship. The transition towards a holistically sustainable society we are now looking into, involves a similar or even bigger societal effort by engaging all corners and sectors of contemporary society. If not, there might be no second chance since the anthropogenic greenhouse gas-emissions already emitted will result in major changes of climate on earth.

This background report takes a Swedish perspective, in an international context. This means that effects of Swedish consumption is an important starting point. It also means that the greenhouse gas-emissions from Swedes' activities are in focus and that effects on equality both within Sweden and internationally are of relevance for the report. Moreover, any proposal answering a call based on this report needs

to present a convincing plan for how international research and experiences as well as international policy agreements are brought into a forthcoming program.

When it comes to time frame and targets in terms of greenhouse gas-emissions, the overall long-term aim of any future program should be a transformation towards a society without net anthropogenic greenhouse gas-emissions. It is however up to each application to decide where in time the proposal sets it focus. A shorter time frame might be justified by the need for immediate action, but a longer time frame might be needed in order to give room for transformational change. The time frame issue is expected to be specified in the proposal.

In the following, we describe four focus areas. The idea is that any application in response to the forthcoming call for proposals, needs to deal with each one of the four focus areas – civil society, digitalisation, equality and transforming futures. Moreover, connections between the focus areas are expected to be profound throughout forthcoming programs, not only integrated in the alternative futures. The four focus areas are of slightly different kind. The first two can be seen as drivers of change. The fact that they are brought up in this background report is not to be interpreted as a statement that they are the two most important drivers of change of society. But they are important, and Mistra has identified it as relevant to highlight them, and to couple them, in a concerted call. The third focus area has to do with effects on society, but it can also to some extent be a driver and/or barrier to change. The fourth focus area connects the other focus areas and brings in a time perspective.

The first driver is *civil society*. We here expect civil society to be a co-applicant in the forthcoming call, and to be investigated as an important possible driver for societal change. The thorough transformation of society that is called for will require investigation of the role of civil society in the transformation and the relations with institutional structures. Civil society is also supposed to be interpreted broadly. The choice of how to frame the program will set the scope and relevance for the participation of civil society organisations.

The second driver of change is *digitalisation*. It should be interpreted broadly and focus should be on the relation between digitalisation and changes of societal structures. So included in this focus area is both the technology as such and how digitalization is transforming, and can transform, society. The main part should be on structural changes of society related to digitalisation, rather than on the environmental effects of the digital hardware.

The exact consequences on ecosystems are hard to foresee, and even harder is it to understand consequences on societies. But there is a significant risk they will be large and that the burdens will not be equally divided between e.g. nations, regions or groups of people. There are numerous suggestions regarding societal instruments to reduce or eliminate greenhouse gas-emissions, but there are risks and negative side-effects associated with all those measures. Among those are risks for increasing gaps in society. Of relevance is also to look into positive and negative connections between degree of segregation and emissions of greenhouse gas in societies. *Equality* is our third focus area.

Finally, through the development of images of alternative futures, it is possible to explore potential consequences of various ways of eliminating greenhouse gas-emissions and scenario descriptions can be a way of bringing together several areas and highlighting goal conflicts. *Transforming futures* is thus the fourth focus area in this background report.

Focus area 1
Civil society

The relation between the individual and the larger community is a core element in the civil society tradition in the sense that civil society is a space for people to associate. They associate with others as well as with institutions at the local, national and even international level of society (Post and Rosenblaum, 2002: 3). When Swedish climate change activist, Greta Thunberg, in 2019 addressed the UN General Assembly with "How dare you" and less than a year before at the World Economic Forum spoke that "our house is on fire", she embodied the individual component of civil society by raising a strong ethical voice. However, this simultaneously shows that for civil society to have a structural role in transforming societies, the voice of the individual must be linked equally to the generation of institutional capacity of organized civil society and to the willingness to create public policies and new corporate and commercial procedures. The mass mobilization of youth in the area of climate change mitigation depicts the digitalization of civil society and is a case of questioning the relations between spontaneous manifestations and organizational influence on structural societal change.

The concept of a civil society appeared in history at a time marked by a deep crisis in the social order "and a breakdown of existing paradigms of the idea of order" (Seligman, 1992: 15). The societies in the late seventeenth and eighteenth centuries were confronted with a tremendous break with the traditions and customs of the past "as the binding forces of society" (Seligman, 1992: 16). Under the influence of climate change, we the citizens of the Twenty First Century may be facing a similar breakdown of the traditions and customs of our immediate past. The customs of such crucial areas as production, consumption and transportation may not be sustainable if perceived against their direct and indirect impact on climate change. Moreover, the objective of addressing inequality at a global scale is intrinsically related to the objectives of sustainable futures. In the wake of the latest financial crisis, Nobel Prize winning economist, Joseph Stiglitz, argued that the notion that economic growth will necessarily lead to better standards of living is not valid. He further argued, that "the growth that has been achieved may not be sustainable and that the benefits of the growth that has occurred are accruing to but a fraction of the population" (Stiglitz, 2010). Following this line of argumentation, a few years later French economist Thomas Piketty claimed that inequality is about to become bigger than ever before. For the reasons of finding new ways to engage in large scale societal transition such as climate change mitigation without losing the objectives of equality, today "social innovations are as important as technological innovations" (Stiglitz, 2010).

Civil society is a most needed partner of social innovations not only in finding more sustainable economic paradigms as requested by Stiglitz, but perhaps even more so in the area of climate change. Adding to this, to understand the potential of civil society as a responder to climate change we need simultaneously to understand how digitalization has changed the ways in which civil society functions. On the negative side, Skocpol has argued that civil society has changed "from member-

ship to management" with lesser commitment to active engagement. Instead, we find a rise of staff-led professionally driven advocacy groups and nonprofit institutions (Skocpol, 2003: 16) where well-off citizens can invest in civil society-based causes without ever rubbing the elbows with less well-off citizens. On the other hand, the digital foundation of civil society may be the first step towards mass mobilization for climate change mitigation, and thus articulate civil society in the tradition of linking citizens to each other for the greater good and for the benefit of the larger community.

Whereas there is no doubt that civil society paved the way for putting climate change on the agenda of big politics, it is more unclear how this impact can translate into new policies and have an impact on the societal structures. The very structure of civil society has changed during the last decades. At the heydays of the Scandinavian welfare state there also was a peak in organized civil society in the sense of popular political mobilization, membership of trade unions, old membership based popular movements and voluntary associations (Hulgård, 2015). However, today mobilization of citizens, perhaps particularly of the youth, cannot happen without the use of digital media. Digitalization has opened the way towards mobilization of millions of particularly young people across the globe for climate change to such an extent that national parliaments and supra-national organizations are forced to act. When youth are acting for sustainable futures, they articulate that for communities to be sustainable in the end we cannot rely upon atomistic individuals bumping into each other's self-interest, but rather understand them as "a network, a web of individuals-in-community" (Wilson, 1997: 756). A similar emphasis on solidarity or the possibility of mutual trust was Durkheim's answer to utilitarian and contract political theories: "This 'precontractual' trust was, for Durkheim, based on the governing terms of social solidarity..(..)..a vision of the individual where the social is contained in the person, the universal embodied in the particular, and where the sources of moral action rest on the cognizance of the individual sanctity of each member of society" (Seligman, 1992: 120).

Civil society can impact public policy, economy and societal structures through at least three channels and according to Keane (1998) we can distinguish between micro-, meso-, and macro public spheres and their interrelation. According to Habermas (1996), inputs and even power from civil society translates into political action through the sluice model of deliberative democracy, when inputs are picked up by public policy or when powerful societal structures are forced to change. In this sense even micro public spheres contain a transformative potential that goes beyond local contexts. They can transcend mere micro-public spheres to obtain greater transformative power on the wider society (Keane, 1998). In this sense, change agents and social innovators who remain loyal to their origin in local social contexts can generate organizations that are simultaneously enterprises and public spaces whereby they are comparable to the classical (Habermasian) coffeehouses and literary circles that formed a significant background for the early modern public sphere in liberal democracies. Locally oriented social entrepreneurs who mediate between the power dynamics of state and market and their socially marginalized communities are working in the intersection of social policy, local community and micro public spheres, and are thus vital parts of social movements that may gradually gain the capacity to generate into meso- and macro public spheres or even become strong publics in the sense of self-management (Fraser, 1992: 135) and experimental centres for co-production (Pestoff, 2009). Initially they are "local spaces in which citizens enter into disputes about who does and who ought to get what, when and how" (Keane, 1998: 170), but occasionally some of these spaces succeed in becoming agenda setting and large scale transformative since "all large scale institutions ultimately rest on the cooperation of their subordinates" (Keane, 1998: 170).

Concerning the important question of equality, the Scandinavian countries form a unique background and a laboratory for a new reconciliation between an empowered civil society and a continuation of the universal orientation of the welfare state aimed at climate change mitigation. On the one hand, Scandinavia has followed the international trend of privatization and decline in the universal welfare state. This has been described as a process towards rampant privatization and for profit providers "becoming quite strong in the past 20 years" (Jeppsson Grassman, 2014: 156) and a welfare state that may be ill equipped to protect its citizens unless a better defined role for civil society and the third sector can be determined (Pestoff, 2009). On the other hand, Scandinavian history is marked by unique collaboration between the three spheres of modern society for a radical reduction of inequality: state, market and civil society.

With its origin in the universal welfare model (Esping-Andersen, 1990) Sweden and the Nordic countries have a tradition of active intervention in the lives of citizens and communities for the sake of comprehensive risk coverage and generation of high and full employment (Jeppsson Grassman, 2014). This experience of collaboration and co-production could serve as an inspiring starting point for climate change mitigation with the use of digitalization and without losing the objectives of equality. To achieve this there is a need to explore under which circumstances civil society may and may not contribute to climate change mitigation. In an era of profound digitalization, masses of people can be called upon to meet and act for all types of causes, among only some may be contributing to pave the way towards a sustainable society committed to the objectives of social and environmental justice.

When addressing this focus area it is necessary to clearly show under which circumstances and in which situations civil society can contribute to climate change mitigation with an objective of equality and social justice. Furthermore, it is necessary to understand how digitalization constructs and influences agents of civil society and their impact on climate change. Finally, there is a clear case of demonstrating under which conditions an empowered civil society (institutionalized or not) may take on more shared responsibility for climate change mitigation and societal sustainability with respect to its counterparts in government and commercial sectors of society.

Focus area 2
Digitalisation

Digital technologies have become the defining feature of the 21st Century, from the take-off of the Web, to big data, artificial intelligence, robotics and 5G networks. Such is the scale and pace of transformation that new labels have appeared to describe the transformations that are underway, for instance 'The 4th Industrial Revolution' (Schwab 2016) or 'Society 5.0' [1]. Whilst these terms are debatable, they highlight that digitalisation is never only a question of technology per se but is always also inextricably bound with a far wider set of changing social processes and practices. Digitalisation is now implicated in all parts of society and this is only set to deepen and broaden as new technologies continue to emerge, shaping and re-shaping our world in ever more complex and uneven ways. It is increasingly difficult, perhaps impossible, to think about our world independently from digitalisation.

As we face the crisis of climate change, the question is: what part can digitalisation play in its' mitigation and, more widely, in shaping the sustainability of future societies? There is already a long history of research developing digital approaches for climate change mitigation. For example:

1. Using digital data and artificial intelligence to manage energy consumption more efficiently e.g. automatically adjusting building heating/cooling systems;
2. Using digital technologies to lower the energy consumption of existing ways of life e.g. improved teleconferencing to reduce business travel, electric vehicles to reduce carbon emissions from private cars;
3. Using digital tools to support individual behaviour change e.g. apps to inform users about their energy consumption, gamification to reward behaviour change etc.

Whilst each of these examples (and many other versions of such interventions) have the potential to make an important contribution to climate change mitigation, their effects may be limited for a number of reasons:

- Over-emphasis on the development of technologies and under-emphasis on the social processes through which these come into use;
- Lack of attention to the social practices which shape the relevance, take-up and impact of digital tools for climate change mitigation. This includes making normative assumptions of users, their motivations, social circumstances and goals; and wider social structures, divisions and inequalities;
- Failure to challenge existing systems of provision, locking future societies into current patterns of production and consumption rather than pursuing more creative and/or radical alternatives

In addition, it is clear that digitalisation is also contributing to climate change in some key ways both through direct energy use and through the services provided. In terms of hardware, computational infrastructures consume considerable amounts of electricity. Assessments regarding how that consumption will change

with quickly increasing digitalisation driving towards greater need for datacentres, transmission capacity and computation capacity, varies a lot, as illustrated by e.g. the different views on how to look at the effects of bitcoin use the coming years (Mora et al 2018, Masanet et al 2019). Even if the forecasts on electricity use in future varies vastly, it can be concluded that electricity use of the hardware supporting digitalisation is a topic that needs continued interest.

Impact of digitised services such as AirB&B, Uber, Deliveroo, Amazon can be through e.g. generating new journeys and contributing to climate change. There is evidence from Euromonitor data to suggest that the rise of online taxi apps poses a risk to the fight against pollution and climate changing emissions: 'T&E estimates that Uber operations in the urban areas of London, Paris, and Brussels combined contribute around 525 kt CO_2 per year – as much as a quarter of a million average cars , which runs counter the cities' ambitions to reduce their climate footprint (Transport and Environment, 2018).

Simply said, environmental effects of digitalisation can be divided into direct effects and indirect effects. The direct effects are caused by production, use and disposal of hardware, whereas indirect effects are effects of information and communication technology (ICT) on other sectors than the ICT-sector (see for example Hilty et al, 2015, Pouri et al, 2018).

One reason for the difficulties in pointing out the total effects on greenhouse gas emissions from digitalisation is that the indirect effects of digitalisation are highly dependent on external factors such as policies and business models. And the indirect effects may well be of another scale than the direct effects – both in positive and negative direction. E.g. through digitalisation, transport can be made more efficient, or even redundant, thus reducing the amount of greenhouse gas-emissions for a specific trip or purpose. But if that efficiency improvement is not complemented with other changes, the total traffic may well increase due to the effect of induced traffic.

In short, digitalisation brings both opportunities and risks for climate change mitigation and these must be placed within a broader context in order to ensure sustainable future societies. One way of illustrating the fact that more or less any reform, technological innovation or change in activity pattern holds both opportunities and risks is by placing opportunity and risk orthogonally in the "policy map" presented in Figure 1.

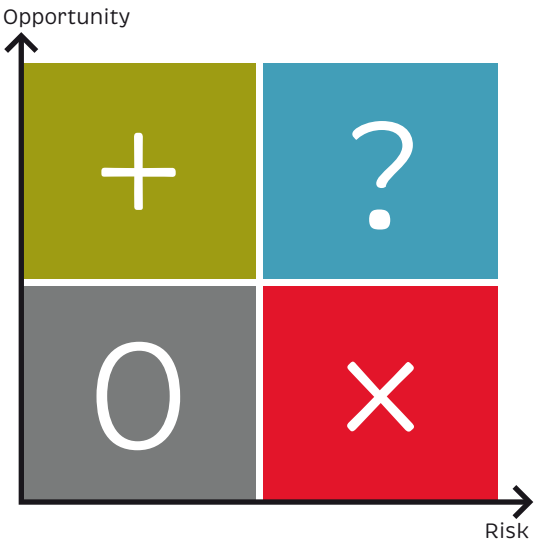

FIGURE 1: A "policy map", indicating the role of policy for various digitalisation solutions.
SOURCE: BÖRJESSON RIVERA ET AL, 2018

The idea with the figure is to highlight that for many digital services, policy can be crucial for the outcome in relation to a specific target, than the service in itself. Thus, the policy map is supposed to be used as a tool to find services of importance for policy making, when striving for a certain target. The process starts with identifying services related to areas of importance (for example when it comes to greenhouse gas-emissions, transport could be such an area, and Uber could be such a service). Then the service in question is placed in the figure. Services in the bottom left corner are of little interest for the target in question. In the bottom right corner you find risky services that should be counteracted with policy and in the top left corner services with mainly positive potential. Therefore, from a policy perspective, the services in the top right corner are those in need of most care. They are services that can lead to either positive or negative total effects, and therefore a policy analysis is here highly important. (Börjesson Rivera et al, 2018).

In this background report, we use the "policy map" to highlight that the key issues to deal with in a forthcoming program must focus on issues placed in the top right corner. This is a background report on sustainable societal structures, with a

focus on climate change mitigation. Therefore, the changes of interest should be of great magnitude. One consequence of this is that proposals need to focus on greenhouse gas-emissions from areas with a high share of emissions, such as transport, buildings and food (Börjesson et al, 2018).

The policy map above only indicates opportunities and risks in relation to the specified target, here abolition of greenhouse gas-emissions. This means that if that was the only guiding principle when transforming society other issues e.g. resource use and equality would be neglected. Proposals to the forthcoming call, should stress how policy can be developed to

- support digitalisation for radically reduced greenhouse gas-emissions and
- avoid digitalisation that increases greenhouse gas-emissions and
- avoid digitalisation that affects other targets negatively

There are numerous examples of negative social effects of new digital services. Therefore, many cities[2] are now regulating how AirBnB is allowed to act, since it can undermine the private rental housing market for local people and 'hollow out' local civil society. E.g. Santa Monica has effectively wiped out 80% of its Airbnb listings by instituting the toughest regulations[3] on short-term rentals in the U.S. The southern California city said it was spurred by overall increases in housing prices and dwindling housing supply. The new regulations, which have been effective since June 2015, require anyone putting a listing on Airbnb in Santa Monica to live on the property during the renter's stay, register for a business license, and collect a 14% occupancy tax[4] from users that will be payable to the city. Paris[5] and Prague[6] are examples of other cities also regulating AirBnB for similar reasons.

The "gig-economy" also risks creating new inequalities on the labour market with a strong push downwards on payment for simple services such as deliveries. Through digitalisation individuals can outbid each other in a spiral towards the absolute minimum in terms of payment. Those new forms of work evade labour law and unionisation, and increase precarity and the social problems associated with this[7]. Examples of services that risk bringing those effects are platforms such as Uber and Deliveroo (Wood et al, 2018; Graham et al, 2017). Furthermore, there have been debates on taxation of some of the major platform companies by-passing existing modes of regulation and governability e.g. as supra-national organizations that pay little tax[8].

Above are only a few examples out of many potential "unseens", or unintended side-effects (Scholz et al, 2018) of digitalisation. Those kinds of risks, as well as environmental risks in terms of e.g. resource depletion, need to be considered when searching for how digitalisation can support climate targets.

2 *https://www.investopedia.com/articles/investing/083115/top-cities-where-airbnb-legal-or-illegal.asp*

3 New Regulations To Wipe Out 80% Of Airbnb Rentals In California's Santa Monica

4 *https://www.businessinsider.com/airbnb-vrbo-regulations-los-angeles-what-it-means-for-hosts-renters-2018-5*

5 *https://www.bloomberg.com/tosv2.html?vid=&uuid=a133a9d0-9756-11e9-9ff0-57aecebe4b0c&url=L25ld-3MvYXJ0aWNsZXMvMjAxNC0wOC0wNy9wYXJpcy1haXJibmItY29wcy13YW50LXRvLWtub3ctaW-YteW91LXJlLXJlbnRhbC1pcy1sZWdhbA==*

6 *https://www.theguardian.com/environment/2020/feb/01/overwhelmed-prague-tries-to-limit-airbnb-to-curb-tourism*

7 *https://www.forbes.com/sites/robertwood/2019/09/11/california-law-making-gig-workers-employees-could-hit-uber-lyft--others/*

8 *https://fortune.com/2019/02/14/amazon-doesnt-pay-federal-taxes-2019/*

Focus area 3
Equality

In the wake of World War II, Sweden and the Nordic countries in general were successful with reducing inequality through state led intervention. Although the so-called Scandinavian welfare was the smallest cluster among the three major European welfare models (Esping-Andersen, 1990) the expansion of the state did not lead to a decline in civil society. On the contrary, it is more likely that the comparative success of the Nordic countries is a result of concerted actions between an institutionalized civil society, active state intervention and an entrepreneurial commercial sector.

A similar approach may be needed when addressing the huge challenges of climate change if the objective is to reduce the possibilities for an increase in multiple forms of inequality caused by global warming. Historically, the Scandinavian welfare state facilitates a relationship between civil society and state that nourishes bridging social capital that encourage people to perceive themselves as being members of a broader national community rather than merely worrying about their own family, immediate neighbors, and their individual benefits (Hulgård, 2015). This model of welfare is based upon a conception of social justice that does not merely see man as an individual or as belonging to specific local communities or associations but as a citizen with social rights in situations of need such as the need for education, mobility, safety and health (Titmuss, 1987: 264). This framework may be relevant to adapt to the contemporary situation of climate change mitigation that demands concerted action if not giving way to a dramatic increase in patterns of inequality.

It has been observed that wealthy countries have benefited disproportionately from activities causing global warming, while impoverished countries suffer disproportionately from the impacts (see e.g. Davis et al, 2016; Hansen et al, 2016; Mahlstein et al, 2011). In addition, global warming has been suggested to have increased global economic inequality even further. A recent study (Diffenbaugh et al, 2019) linked economic growth to fluctuations in temperature and demonstrated a general increase of growth in cool countries and decrease growth in warm countries. Because the majority of the world's warmest countries are impoverished, low-income or emerging economies, the majority of negative impacts have been concentrated in these countries. Likewise, because the majority of the world's richest countries are temperate or cool, the median likelihood is that the majority of rich countries have benefited economically. The net effect of these economic impacts is that country-level inequality has very likely increased as a result of global warming. In addition, natural disasters such as storms, floods, droughts and epidemics tend to hit low-income communities the hardest since the infrastructure in such countries lacks the capacity to reduce the negative effects.

More gradual environmental change can also have a strong impact. For example, aquatic systems that sustain fisheries and aquaculture are undergoing significant changes as a result of global warming and projections indicate that these changes will be accentuated in the future. As a consequence, climate change affects already

vulnerable communities and livelihoods in fisheries and aquaculture (Barange et al, 2018).

Sweden is an advanced welfare state with relatively small differences in income and living conditions in the Swedish population. However, income inequalities have increased more in Sweden than in other OECD countries since the mid-1980s. Income differences between foreign-born and individuals born in Sweden have increased in recent decades (Swedish Government, 2018), and the gap between different geographical areas in Sweden has widened. Inequality does not only relate to economic wealth. When individuals and entire communities are caught in situations of a lack of access to health, education and mobility in general engagement in handling the negative consequences of climate change are minimal. Here there is a case for concerted action between the government, the corporate world and the organized civil society both to engage in reducing the risks for impoverished communities and to invest in and develop the institutional capacity of these communities.

There are limited studies on the effect of increasing inequalities on climate change, but studies argue (Hamann et al, 2018) that the perception of existing inequalities can be a driver for behaviours with impact on climate change. It is also suggested that inequalities within groups managing a shared resource, may lead to loss of trust, less cooperation, and the unsustainable use of the resources. It would however be warranted to further explore the connection of inequality and climate change mitigation.

In their latest report, the Swedish Climate Policy Council (2019) concluded that achieving net-zero emissions by 2045 would require a fundamental systemic change that would resonate throughout society. However, the launch of policy actions targeting systemic change would need to have broad acceptance of all parts of society for being successful. Actions via policy instruments such as taxes, fees, regulations, public sector consumption and investments would be expected to directly affect citizens. The societal impact of these actions would be expected to have an unequal distribution, to a large extent depending on individuals' income, access to labour markets and geographical settings. The Green Deal published by the European Commission in 2019 highlighted the importance of a just transition and suggested mechanisms such as facilitating employment opportunities in new sectors and those in transition and improving energy-efficient housing.

Carbon taxes are considered one of the key economic instruments for climate change mitigation. However, concerns have been raised on carbon taxes impact on income inequality, as some carbon taxes can have a greater adverse impact on lower income households relative to higher-income households. Further, studies in Finland found that households located in the countryside consume significantly higher amounts of transport fuel than city households, suggesting that lower-income households living in less densely populated areas are particularly vulnerable to fuel tax increases, unless they are compensated by transfers or other means (Sipila et al, 2018). By recycling the carbon tax revenue back to the economy, adverse impacts on equality can be mitigated, as demonstrated in a report by SITRA (Tamminen et al, 2019).

For successful leadership and governance, institutions perceived to be reliable for the public are needed. Growing inequalities may result in part of the population being left behind, lacking a perceived influence on political decisions that have an impact on everyday life.

As demonstrated in the previous chapter, civil society has the potential to be a gamechanger in pressing political issues and as such contribute to awareness and commitment of the public. In a highly digitized society, equal access to, and ability to benefit from digital technologies is key for this to have the greatest effect.

Digitalization allows for novel models for the public sector to open up their processes. By designing participatory democracy and applying methods that allow cit-

izens to influence the city budget, valuable connection between local community engagement and local governance would be created.

In addition, hybrids between civil society and traditional entrepreneurs, social entrepreneurs, developing solutions with a direct environmental impact, have potential for significant leverage on local development for climate change mitigation. Exploring the opportunities of digitalized communities have resulted in innovative business models for sustainability for example on solidarity economy.

Focus area 4
Transforming Futures for Climate change mitigation

Thinking about the future is challenging – predictions are used and needed for a lot of reasons in both everyday life and in long-term planning of vastly different activities such as school planning, infrastructure planning and pensions system design. Meanwhile, predictions can be problematic in themselves, and do not tend to deal with the more complex challenges of social change that are necessary when approaching alternative futures fulfilling targets that are hard to reach, such as a target of no anthropogenic greenhouse gas-emissions.

A way of looking at different ways of approaching the future is to use the division between Predictive, Explorative and Normative scenarios presented in Börjeson et al (2006). In the terminology of Börjeson et al, Predictive scenarios answer the question "What will happen?", and are a foundation for a lot of planning, for individuals as well as for public and private organisations. Explorative scenarios answer the question "What could happen?", and is a basis for what has been called scenario planning (van der Heijden, 1996), often used by companies for exploring strategies to deal with uncertainty regarding external factors in a changing world.

Normative scenarios answer the question "How can a certain target be reached?". This latter category is divided into "Preserving scenarios", in practice e.g. a lot of spatial planning. The other subcategory of Normative scenarios is "Transforming scenarios", occupied with developing scenarios that are fulfilling certain targets that cannot be reached without changing basic societal structures.

It should be noted that all the three scenario categories include normative elements (such as the choice of what to predict, how the prediction model is set up and what to explore in the Explorative scenarios). But only the Normative scenarios use specified targets as a starting point.

All predictions are based on assumptions. And all predictions will in themselves affect the future. Current scenarios from IPCC point at a strong climate change the coming decennia (IPCC, 2018). If that change is to be mitigated to levels not threatening catastrophic effects of the climate, major changes to society will be needed. But it is not easy to keep up a public discussion on what that future could look like. One reason for this might be the power of predictions. It is difficult to imagine change, but easy to think about continuing development along trends.

A feature of the climate change topic is that it entirely rewrites the conditions for Predictions. It turns out that many current Predictions are based on models that do not take emission targets of greenhouse gas into account. As an example the Swedish Transport Administration has a basic forecast on road transport volumes indicating an increase of goods transport volumes by 67% and by passenger transport by 30% 2012–2040 (Swedish Transport Administration, 2018). The forecast is mainly based on assumptions regarding historical traffic development and economic development. They do not take national targets of greenhouse gas-emissions into account. In fact, the term "climate" is not mentioned in the report, despite the

long time horizon for the forecast. This is noteworthy for two reasons: One is that apparently the Transport Administration is not planning for fulfilling the governments targets. The other is that the forecasts fail to take one of the most important factors into account – the actual climate change. Making long-term forecasts without considering climate change is remarkable, since climate change is one of the research areas with most focus on long-term change, while also being an areas that will affect economy deeply.

It is also easy to find theoretical support for the need to engage in creating alternative futures. For example John Urry has argued that 'who or what owns the future' (Urry 2016; 11) is an exercise of power. And it can be claimed that dominant imaginaries 'shape what is thinkable' (Ruppert 2018; 19) or to put it more directly, operate as a 'colonization of the future' (Giddens 1991, Amsler and Facer 2017; 7). Thus, how the future is presented matters. Who presents the future matters. And who has the capacity to think about the future is a question of privilege, inequality and social justice. The odds are stacked unevenly in terms of who has the social, economic and cultural assets to imagine the future and the resources to turn this imagination in to reality. How might things be otherwise? How can we turn the 'politics of probability' – that things will carry on as they are or get worse – into strategies for 'the politics of possibility' that change futures for the better, environmentally and socially? (Appadurai, 2013). The complex assemblages of social life that make the future hard to predict also open-up possibilities for unforeseen change and disruption, for alternative futures – futures, perhaps, that 'people would sooner inhabit' (Jasanoff 2015)

Thus, one important task for anyone engaged in how society is to cope with climate change mitigation, is to develop alternative futures, i.e. alternatives to predictions based on unsustainable practices. Or phrased in another way, there is a need for images of the future illustrating societies fulfilling far-reaching targets on reductions of greenhouse gases.

Suggested requirements on a future research program

In the following, we mostly follow the outline of the report and highlight the most important suggested requirements on a forthcoming research program following this background report and a forthcoming call from Mistra.

We find the requirements important for a future research program to be successful and have a strong impact on societal transformation towards a society without net greenhouse gas emissions, taking issues of inequalities into account, and with support from a wise development of digitalisation and civil society.

Civil society

As should be clear from the description in the Civil society-chapter above, this background report emphasizes the role of civil society in a successful structural change of society towards a society without net emissions of greenhouse gases, and without societal tensions related to this. The report leaves it open for the program descriptions on how they choose to investigate how civil society best can become a positive force in that transformation.

For example, civil society might have a role to play if there is a conflict between the aim of phasing out greenhouse gas emissions, and the measures most people are prepared to take. And in overcoming potential tensions emerging when society transforms. Moreover, the role of civil society in supporting, embracing and stimulating innovations contributing to the transformation, can be something to look into.

It is in line with this call to investigate how a generally higher degree of societal responsibility could become a driving force to combat climate change. One idea is to build on previous successful development of the Scandinavian welfare state, and look into how societal contracts can be developed. One starting point could be to look into how digitalisation can work both as something that supports contacts (through making it easier to find others with same interests) and can increase mental distances (through the opportunity for everyone to only hear and listen to likeminded).

Digitalisation

The successful bid should contribute a step-change in our understanding of the potential for digitalisation to support positive change for climate change mitigation as part of a push towards greater sustainability.

The importance of specifying what sectors' greenhouse gas-emissions could be addressed with digitalisation should not prevent projects to take a transformative approach to society and digitalisation. Digitalisation can be seen as a technology that can alter the way people live, work and play, and this may be a good starting point for looking into how digitalisation can reduce greenhouse gas-emissions.

But the horizon must be kept in sight, meaning that some of the profound changes this program aims at looking into should not be reduced to getting better support for finding the right bus, or a digital nudge to reduce the indoor temperature, but rather looking at larger changes.

This will require prospective consideration is given to if and how these technologies can come into use and the actions necessary to support this. This demands reconsideration of the linear model of innovation – from technology to impact – to ensure that in-depth understanding of the challenges and prospective uses/users are embedded in thinking from the outset. Consequently this will require collaboration and co-production: across disciplines and across sectors (government, industry and civil society).

It is essential that the research undertaken explores the risks for rebound effects, in order to avoid that digitalisation leads to other negative effects, both on the climate and on other societal targets.

Finding new ways of coupling digitalisation and policy development may well be an important strategy here. Digitalisation can transform society, but without considerate policy making that transformation can lead to negative effects on more or less any societal target, climate targets and equality included. An open question is how to involve civil society in using digitalisation to support the targets.

Equality

This background report has the climate change problem as its starting point, but equality is another very important part of it. Proposals to the forthcoming call will need to have a good way of dealing with the potentially strong tensions between measures to combat climate change and equality as well as risks with digitalisation in terms of e.g. a digital divide, be it between different parts of the world or between individuals.

Meanwhile, there is also the directly positive side of the relation between those areas. Investigating how working for equality can support (or counteract) climate change mitigation is a part of this program as investigations into how this can be supported (or compensated) with digitalisation.

Moreover, the role of civil society in re-distributing powers in order for the public to act and influence on policy instruments for climate change mitigation, is a topic well worth considering.

The role of civil society in contributing to successful use of policy instruments in the terms of acceptance and how adverse effects of use of policy instruments on vulnerable groups can be mitigated, are also important and possible parts of a future research program.

Transforming futures

The focus area on Transforming futures requires descriptions of futures where there are no net emissions of greenhouse gases, as described in the introduction, or where society is clearly on this path, without negative side effects on especially equality. There need to be some kind of rigorous analysis in the scenarios of how emissions of greenhouse gases have been stopped.

In essence, the futures must include a number of different parts:

First, the role of digitalisation. More specifically – in what ways have society changed so that digitalisation is playing a concrete role as a provider of services enabling the climate-neutral society? And what is done to mitigate the negative consequences of digitalisation? How can processes of digital innovation for climate change mitigation be implemented in ways that are inclusive and participatory? How does an innovation system, supporting this, look like?

Second – equality. More specifically – how is society handling the risks that measures for climate change mitigation exacerbate inequalities or create new inequalities? Things that could need further attention are e.g. the fact that Swedish consumption is placed in a global production system, emphasized by opportunities from digitalisation. And the risks for a digital divide, i.e. differences by those with access to digital services and those who have not, and how this is counteracted

Third – civil society. More specifically – how can civil society support climate change mitigation? Some issues that could need further attention are the organisation of civil society and opportunities and risks with different versions of civil society organisation, taking digitalisation and issues of equality into account.

General suggested requirements

For each focus area, it is necessary to clearly show what sectors/parts of society are targeted in terms of greenhouse gas-emissions, in order to safeguard that nothing less than fundamental reductions are addressed. Moreover, each of the three first focus areas are expected to relate to one another and the focus area on futures should target all the other three areas.

The program must not only study the role of civil society, but also include civil society-organisations to a certain degree.

The program must cover all focus areas, but it does not need to follow any strict division between the focus areas. On the contrary, it is encouraged to find ways of structuring the program so that the different focus areas do not become separate entities.

The greenhouse gas-target and time frame is expected to be handled in the proposal. Thus, it is up to the program to decide the detailed greenhouse gas-emission target of the program, but it should be clearly on track towards a net zero-emission society.

Some kind of equality targets should be at least discussed in the proposal. It should also describe how the relation between equality and climate change will be dealt with.

An international perspective is required in the program. This means both that issues such as global inequalities and the effects from Swedes' activities and consumption on other countries should be included, that international regulations should be a part of the program and that international outlooks wherever possible are expected.

Appendice
Terms of reference for the working group

Sustainable Societal Structures

Background

We live in challenging times which also offer a momentum for transformative change and many new possibilities. Several of the fundamental building blocks of our society were established in an era which presented its citizens with different constraints, threats and possibilities. Which changes are needed? How can we find new ways of collaborating? What in our society do we need to cherish and maintain?

Within the Swedish population there are relatively small differences in income and living conditions. However, income inequalities have increased more in Sweden than in other OECD countries since the mid-1980s. Income differences between foreign-born and individuals born in Sweden have increased in recent decades, and the gap between different geographical areas in Sweden has widened. Gender based income inequality is decreasing, but significant differences remain. This is the basis for the Commission for Equality which is to submit proposals aimed at increasing economic equality in the long term and increasing the opportunities for social mobility.[9]

Although Sweden is considered a front-runner when it comes to environmental policies and practices, the average carbon footprint per person and year in Sweden is around ten tonnes. This is significantly higher than the global average, and five times higher than the two tonnes per person which is needed to keep the global temperature increase below two degrees[10]. The environmental consequences of Swedish consumption are not limited to greenhouse gas emissions, but also negatively impact air pollution and exert pressure on natural resources (land use, blue water consumption, virgin materials) as well use of chemicals and deforestation coupled to consumption[11]. How can a future society which encourages a more sustainable way of living be planned?

The Swedish Government's objective is for Sweden to become the world leader in making use of the opportunities of digital transformation. The vision is a sustainable digitalised Sweden, and the digitalisation strategy[12] focuses digital skills, digital security, digital innovation, digital leadership and digital infrastructure. Some attention is given to governance for societal goals, however much focus is on the

9 *https://jamlikhetskommissionen.se/uppdrag/*

10 *http://www.swedishepa.se/Environmental-objectives-and-cooperation/Swedish-environmental-work/Work-areas/Climate/How-can-I-reduce-my-carbon-footprint-/*

11 Steinbach et al, Miljöpåverkan från svensk konsumtion – nya indikatorer för uppföljning. Slutrapport för forskningsprogrammet PRINCE. Naturvårdsverket rapport 6842 (2018).

12 *https://www.regeringen.se/49adea/contentassets/5429e024be6847fc907b786ab954228f/digitaliseringsstrategin_slutlig_170518-2.pdf*

digitalisation as such. The vision for the future sustainable society should be the ultimate objective here and digitalisation a major enabler. Policy instruments and action need to steer the fast development towards societal goals, such as the sustainable development goals and the Swedish environmental objectives, and not further us away from them. By optimizing and using new digital solutions within old societal structures, such as linear economy and ownership ideals, there is a strong risk of fast development furthering us from these goals. Although digitalisation provides many opportunities, also for sustainable development, it will not automatically lead to resource efficiency, reduction of air pollutants, increased social cohesion, etc. Digitalisation adds speed, not necessarily in the right direction.

Sweden has no central cross-sector planning on the national level for land, and the regional planning is relatively limited. The autonomy at the local municipality level is significant. This makes it difficult to maintain a system's perspective in physical planning. Building is regulated through the Planning and Building Act (PBL), according to which different public interests must be weighed against each other in an open and democratic process, also taking into account the rights of individuals.

We see a need for strengthening the existing collaboration between disciplines and between sectors, as well as introducing new angles, experiences and perspectives (from for instance youth and the civil society). Our emphasis is on long-term, system's perspectives within policy and planning. This is needed to maintain and develop societal structures to facilitate the transformation to a sustainable society (and to take responsibility for the digitalisation of society).

A new research programme funded by Mistra

Mistra's Board has decided that a proposal for a funding application call in the research area of 'Sustainable Societal Structures' should be drawn up. This proposal is to be based on an analysis of the state of the art in research and of society's knowledge needs.

An initial workshop with Swedish stakeholders took place in Stockholm May 2019. At the workshop, representatives from industry, government agencies and civil society discussed challenges around environment, ethics, societal structures and digitalization. Based on this workshop and internal discussions, Mistra envisage a research programme where a systemic perspective is key, but where the individual perspective will also be addressed.

Through a systemic, transdisciplinary and cross-sectorial approach Mistra seeks to contribute to a socially and ecologically sustainable future for all. The planned research programme will focus on planning, developing and governing society in line with planetary boundaries and Agenda 2030. Our aim is to take a holistic approach, including both current and emerging social and environmental issues. The present programme will focus primarily on the Swedish context, however, we foresee it will address areas of international relevance. For instance, the program may cover issues around climate change and adaptation, the digital transformation, social innovation, ethics, equality and just transition as well as the future of the welfare state. The working group preparing the background report is encouraged to give their view on this and if relevant suggest limitations, focus areas, etc.

Mistra envisages a research programme to be started early 2021 and to run for eight years depending on a favourable review after four years. Mistra intends to provide funding in the range of 12-18 MSEK annually for the programme which will involve scientists from universities and institutes primarily from Sweden, but may include international collaboration which may also be funded by Mistra. The programme will be transdisciplinary and thus also engage various stakeholders, we foresee that especially the civil society would be relevant to involve. The working group is encouraged to give their view on the budget frame as well as stakeholderengagement.

The assignment

A working group comprising of Swedish and international experts will draw up a background report as documentation for Mistra's Board, ahead of a forthcoming decision on whether to call for applications for research funds in the area described above. The background report should be a maximum of 40 pages.

The group's tasks are:

- to give a general overview of the state-of-the-art in the area,internationally
- to provide conclusions and recommendations to Mistra on scope and characteristics for a new researchprogramme
- to draft concrete details regarding the orientation for a future call for funding, maximum one page (that could be used as part of the actual calltext)

The scope of the background paper is quite wide. This may be so also for the subsequent call for proposals, but the background paper may suggest limitations.

A final report must be submitted to Mistra not later than February 5. Before the submission of the final report, the working group should hold two meetings, one of which takes place in Stockholm on January 21-22 2019. The work load in total is approximated to be a week, for a member of the working group.

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