Investigating the potential of applying theories on rebound effects to the climate discourse: The case of climate change adaptation in winter tourism

Presentation at the session “Rebound Effect I: Energy, efficiency, and Growth” at the Fourth International Conference on Degrowth for Ecological Sustainability and Social Equity»

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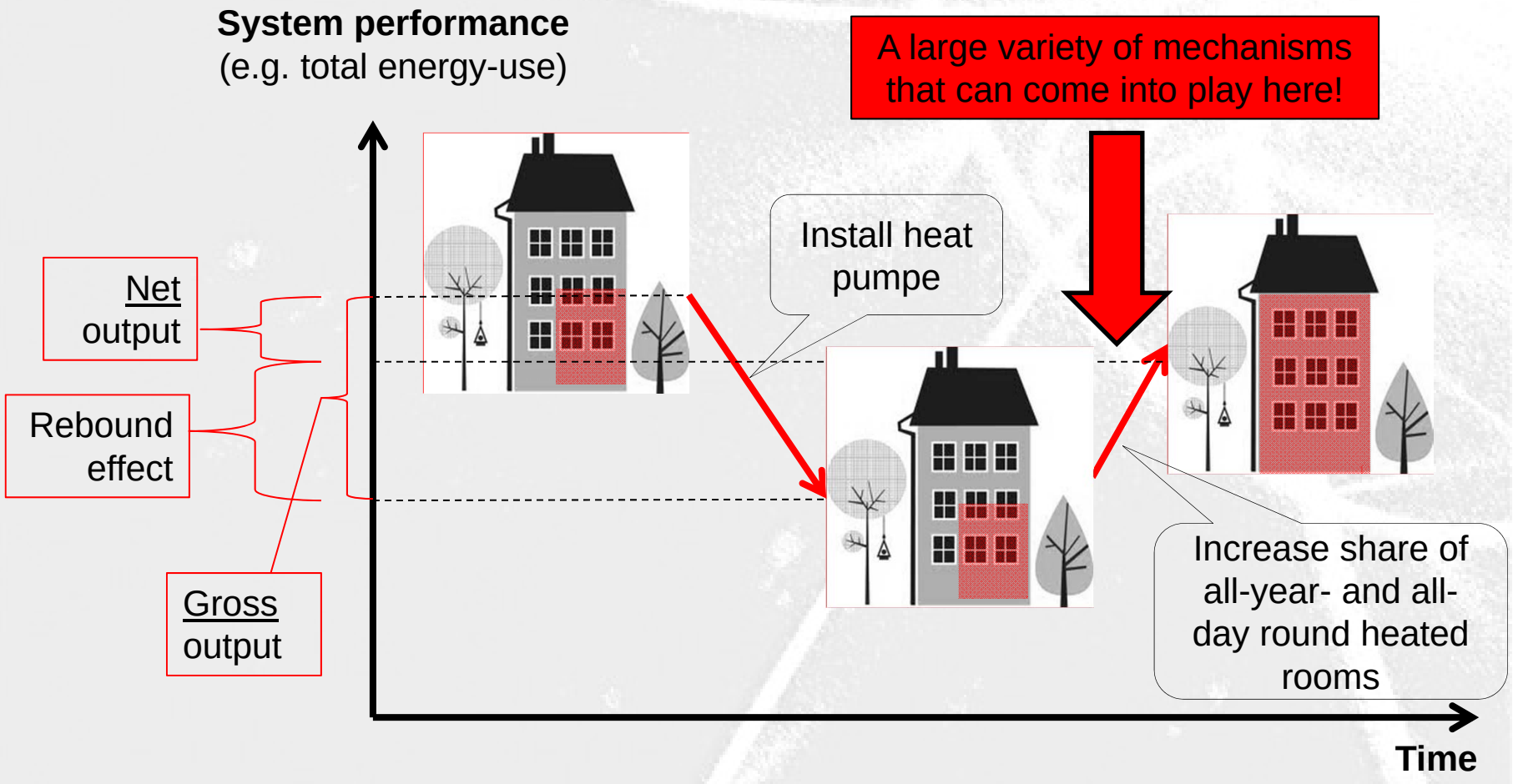
The rebound effects for dummies!



Alternative theoretical perspectives on the rebound effect (1): Economy-related perspectives

Actor level effects

		Primary actor changing behaviour	
		Consumer	Producer
Type of effect	Direct	e.g. more energy efficient heating can make it affordable to heat a larger share of your home	e.g. more energy efficient production process can make it profitable to expand production, thus increasing energy use
	Indirect	e.g. money saved from switching to more energy efficient cars can make it affordable to take more holidays by air	e.g. more energy efficient production process can make it profitable to invest in new products or services, thus increasing energy use

Societal level effects

- A widespread introduction of more energy efficient cars may reduce the demand for petrol by society at large, so that petrol prices will fall, leading to a rise in demand for other petrol-using products, which are now cheaper to operate

Adopted from Santarius, 2012

Alternative theoretical perspectives on the rebound effect (2): Other-than-economy-related perspectives

- **Effects taking place within production**
  - Re-designing effects: e.g. technology increasing car-engine efficiency is often used to allow for more powerful, faster and heavier cars – not only more energy efficient cars
  - Life-cycle effects: Energy-use involved in producing the energy efficiency measure itself and infrastructure necessary to make use of such energy efficiency measure
- **Effects taking place within consumption**
  - Supplementary effects: Consumption of more energy efficient products does sometimes supplement instead of replace conventional products (e.g. the old, more energy-intensive refrigerator one may be put to new use in the holiday home)
  - Moral hazard effect: Technical energy efficiency improvements can make it less troublesome to use of something previously considered environmentally harmful (e.g. switching from a regular to a hybrid car may in itself lead to increased car-use).
  - Moral leaking effect: Technical energy efficiency improvements can reduce motivation for energy saving actions (e.g. introduction of more energy-efficient light bulbs leads to less attention on turning off lights)
  - Moral licensing effect: Consuming one energy-efficient product can result in consumers feeling justified to consume other energy-wasting products

Adopted from Santarius, 2012

Alternative theoretical perspectives on the rebound effect (3): Cross-factor-related perspectives

- **Effects taking place within production**
  - Cross/material cross/multi cross factor effects: Increase in the productivity of one or more factors of production will often lead to increases demand for energy

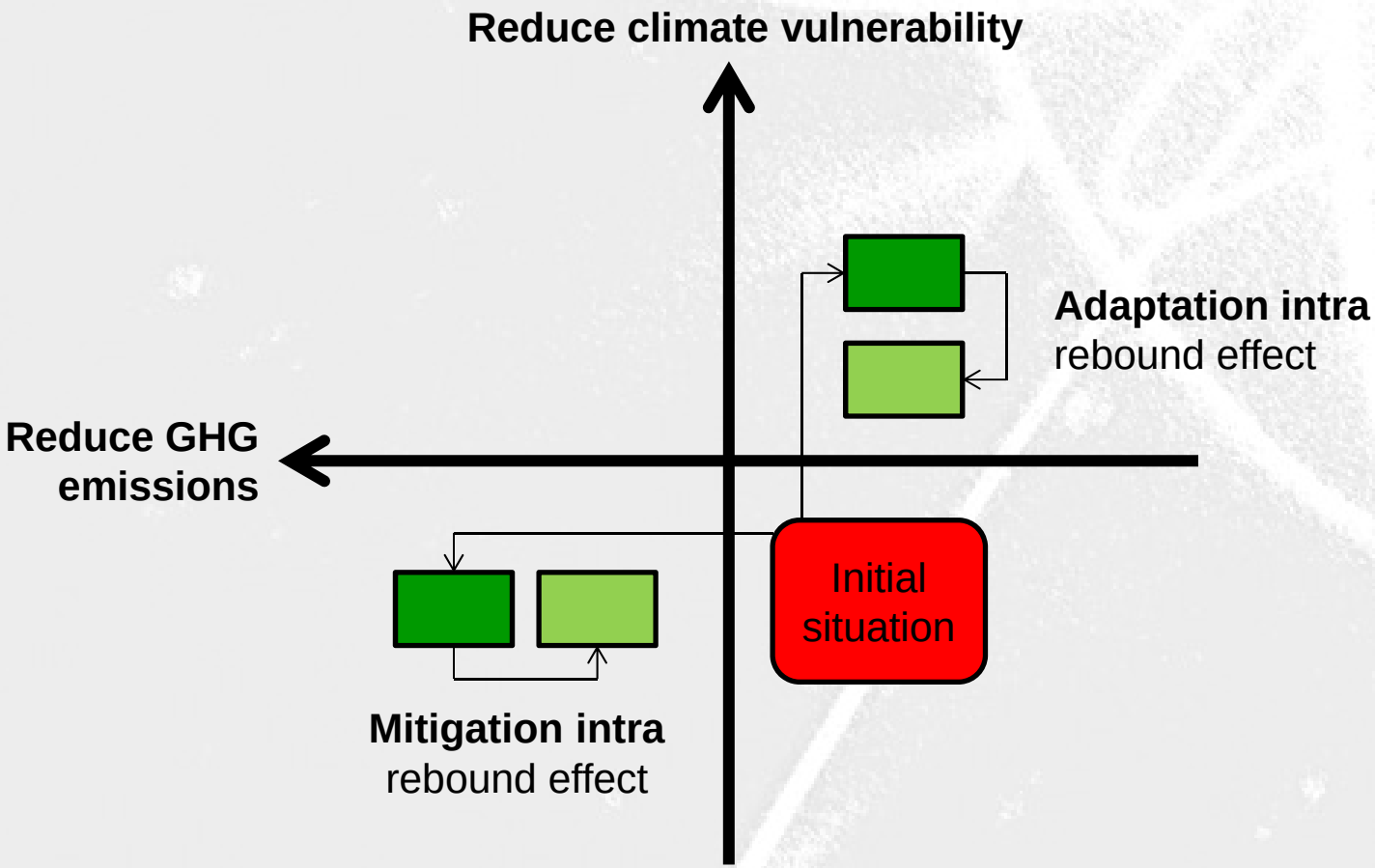
- **Effects taking place within consumption**
  - Consumption efficiency effect: increasing efficiency of consumption can trigger an increased demand for energy (e.g. given that people relatively consistently spend between 0.75 and 1.5 hours per day travelling, a theoretical potential of saved travel time due to technological innovations (e.g. faster cars) converts into longer journeys

Adopted from Santarius, 2012

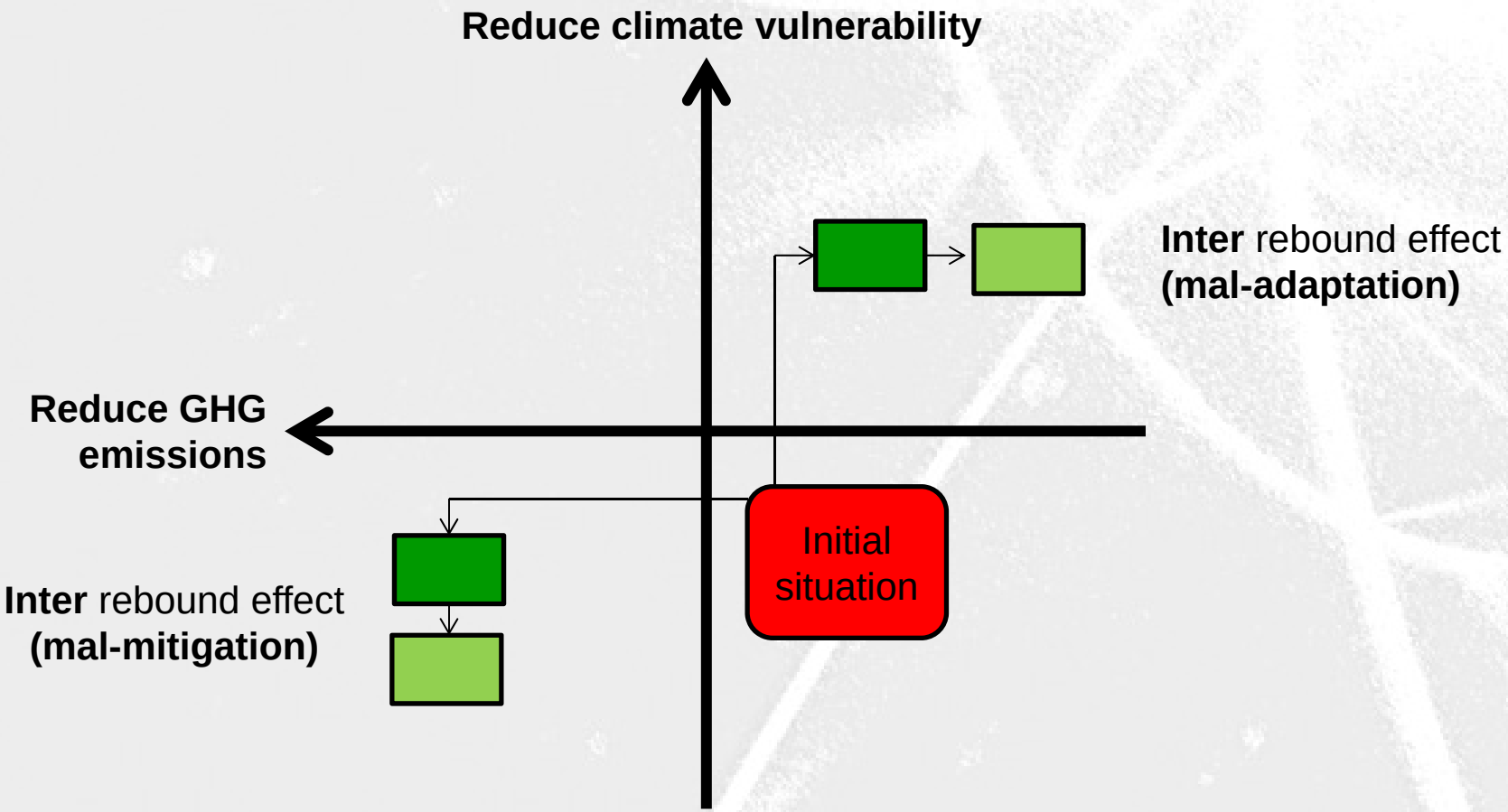
Four ways of relating to climate change mitigation and adaptation

1. **The «only-mitigation» approach**
   - Focusing merely on mitigation out of fear that putting adaptation on the policy agenda may detract attention from mitigation
2. **The «either-or» approach**
   - The belief that we can choose between mitigation (and thus avoid the need for adaptation) and adaptation (hoping it to be less costly than mitigation)
3. **The “one-at-a-time” approach**
   - The acceptance that we have to do both, but no specific efforts to link the two research- and policy-areas in a systematic way
4. **The «both-at-the-same-time» approach**
   - The acceptance that we need to do both at the same time and specific efforts have to be done to treat trade-offs between adaptation and mitigation

Two-levels of rebound effects:
(1) Within mitigation and adaptation policies



Two-levels of rebound effects:
(2) Between mitigation and adaptation policies



Can theories on rebound-effects offer help?

- Theories on the *rebound effect* has helped society understand some of the reasons why major success is still lacking in trying to curve down the energy-use in rich industrialised countries – and thus help society to avoid such effects
- As major climate change mitigation and adaptation policy efforts (hopefully) will increase in the near future, both inter- and intra-rebound effects may become substantial
- Can theories on the rebound effect contribute in the same way in the climate as in the energy discourse?

Climate policy rebound effects

	Climate mitigation	Climate adaptation
Within (intra)	Inefficient mitigation	Inefficient adaptation
Between (inter)	Mal-mitigation	Mal-adaptation

The case of winter tourism in Norway

The carbon context of leisure consumption in Norway

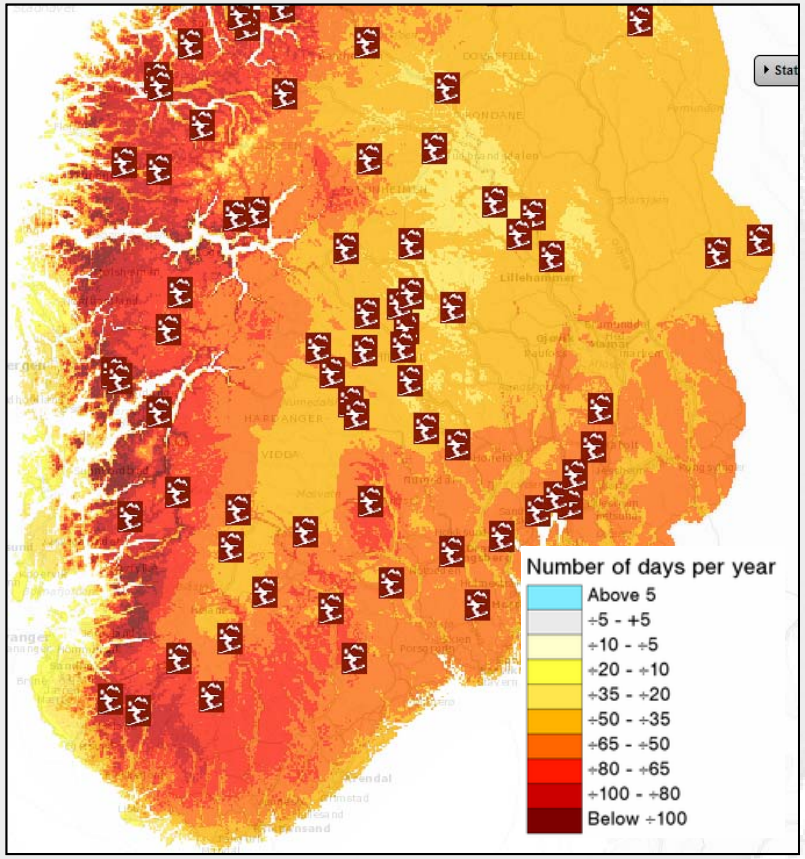
- **Strong trends of increased fossil intensity in leisure consumption of rich industrial countries (like the Nordic countries), due to:**
  - An very strong increase in the total consumption of leisure products and services measured in both economic and terms of embedded energy-use and GHG emissions
  - A very strong increase in leisure mobility, especially that of aero- and cruise ship mobility

- **Hypothesis**
  - Adaptation measures taking place within the context outlined above will most likely lead to an increase in the carbon footprint

Source: Aall et al, 2011

The climate change context of winter tourism in Norway

Change in mean number of days with snow covered ground from 1961-1990 to 2071-2100 + location of ski resorts



GHG emission effects of c.c. adaptation in winter tourism for the case of Norway

Producer adaptation

- Artificial snow production at ski-resorts
  - Direct effect: GHG emissions from artificial snow production
  - Indirect effect: Extended skiing season, leading to more GHG emissions from increased consumption of “skiing”
- Moving ski-lifts to nearby areas with higher snow-reliability
  - Direct effect: GHG emissions from construction of new infrastructure
  - Indirect effect: May lead to also moving away from well established public transportation nodes (e.g. major train stations) and thus leading to a modal shift from public to private transportation (and therefore an accompanying increase in GHG emissions from transportation)

Consumer adaptation

- Chasing for snow
  - The closing down of ski-resorts (often, for geographical reasons, those closest to major cities) may lead to more GHG emissions from transportation to new and more far distant ski resorts
- Adaptation to increased weather variation
  - More frequent shift between wet/dry and hard/soft snow may lead to an increased demand for diversified skiing equipment (skis and clothes for different snow conditions), which again will increase GHG emissions from production of this equipment

Artificial snow production even at the «top of Norway»!

Even at the highest lying ski resort in Norway – Juvasshytta at 1840 MASL located on a glacier – artificial snow making facilities at a total cost of 15 mill NOK have been installed. This is used to produce snow during winter and spring in order to secure snow conditions during the summer season (the resort is closed during winter)

Chasing for snow

- **Web-survey of 200 visitors to the three Norwegian alpine summer ski centres (Stryn, Folgefonna and Juvasshytta)**

- **Share of respondents that would "chase for snow" (by air) of snow-conditions gets to bad in Norway (respondents could choose more than one option)**
  - South America (27%)
  - Oceania (23%)
  - Glacier resorts of the Alps (24%
  - Glacier resorts in North America (10%)
  - Japan (5%)
  - Snow domes (6%)
  - Dry slopes (4%).
  - Quitting skiing in summer (20%)

Source: Demiroglu (work in progress)

Why do mal-adaptation occur in winter tourism?

- Tourism and leisure activities are to a large extent outside the scope of climate mitigation or adaptation policy-making
- Thus, to a large extent adaptation efforts are autonomous and (often) motivated by other than climate concerns
- A main effort to reduce mal-adaptation taking place in winter tourism would therefore be to include to a larger extent tourism and leisure activities in the scope of climate mitigation or adaptation policy-making
- An additional effort could be to inform tourism business actors about the consequences of climate change – thus hoping that this will increase their climate concerns.

Source: Aall and Høyer (2005)

Why do mal-adaptation occur in general?
(other than because of a continuous expansion of the economy)

- **Institutional barriers**
  - Mitigation efforts emerging environmental policy institutions
  - Adaptation efforts emerging from civil protection institutions
- **Institutional path-dependencies related conflicts**
  - Civil protection institutions are established to protect and conserve society – whereas climate change mitigation is (or should be) about changing society
- **Resilience-reductionism**
  - The complex options for society on how to respond to climate change is reduced to the one task: To protect society from major negative impacts of climate change, and thus to maintain society as it is today (Amundsen, 2012; 2014)
  - Thus, there is an obvious danger that this modus operandi for how society should respond to climate change may very well lead to the maintaining of business-as-usual; in other words to secure the continuation of those structures that initially are the causes of climate change and therefore also to obstruct the need for society to enter into a level of transformative changes (Pelling, 2011; O'Brien, 2012)

How to overcome the resilience reductionism

Characteristics	Climate policy institutions	Civil protection institutions
Level of political conflicts	High	Low
Policy-approach	Pro-active	Re-active
Culture of public management	Rests on a civilian tradition	Rests on a military tradition
Administrative capacity	Moderate to high	Low
The role of NGOs	Political	Implementation
Attitude towards climate change as man-induced	Strong supporter	Indifferent
Risk perception	“Mid” alternative	Worse-case
Scientific basis	Natural science dominated	Social science dominated
Perception of change	Much focus on gradual change	Main focus on extreme events
Vulnerability approach	Partial effects of climate change	Sum effects of climate and societal change

Groven et al, 2012

MERGE?

Conclusions

- **There are chances of major mal-adaptation and mal-mitigation happening in climate policymaking**
- **Theories on rebound effect might help us understand mechanisms of why this may happen, to which extent, and how to avoid such negative rebound effects**
- **Topics for further research**
  - Specify the nature and extent of inter and intra rebound effects in the climate policy domain
  - Discuss possible policy means that may counteract such rebound effects

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Thank you for your attention!

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