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Intensification and Marginalization of Landscapes: What do we expect in coming decades

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Technology Tourism Landscape –
Interfaculty Cooperation Centre
Technische Universität Wien - TU Wien

Presentation to Inaba Lab,
Kogakuin University, Shinjuku Campus
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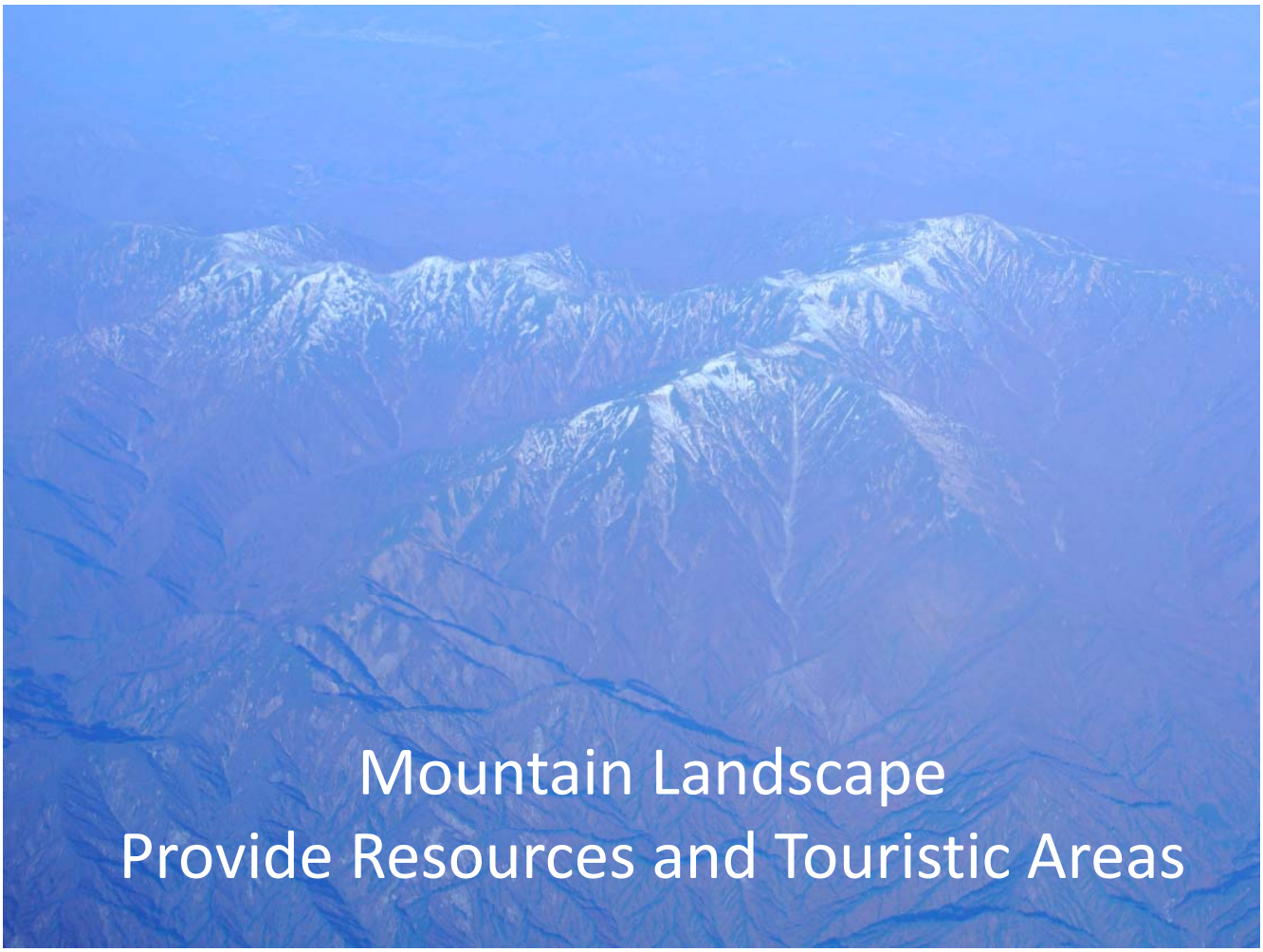
Overview

- Part 1: Landscapes: urban, rural, natural
- Part 2: No escape from Climate Change
- Part 3: Expect Intensified Network of Urban, Marginalized Rural and More Natural Landscapes

Landscape Is:

- The current, visual state of environment
  - The appearance at a particular time
  - We can read many things in the visual landscape
  - Some facts remain hidden
- An arena for all natural and human processes
  - The context to human, animal and plant life
  - Built up by many interdependent elements
  - An integrative, holistic subject in research and planning

Rural Landscapes Provide Food,
Transport, Energy


Mountain Landscape
Provide Resources and Touristic Areas

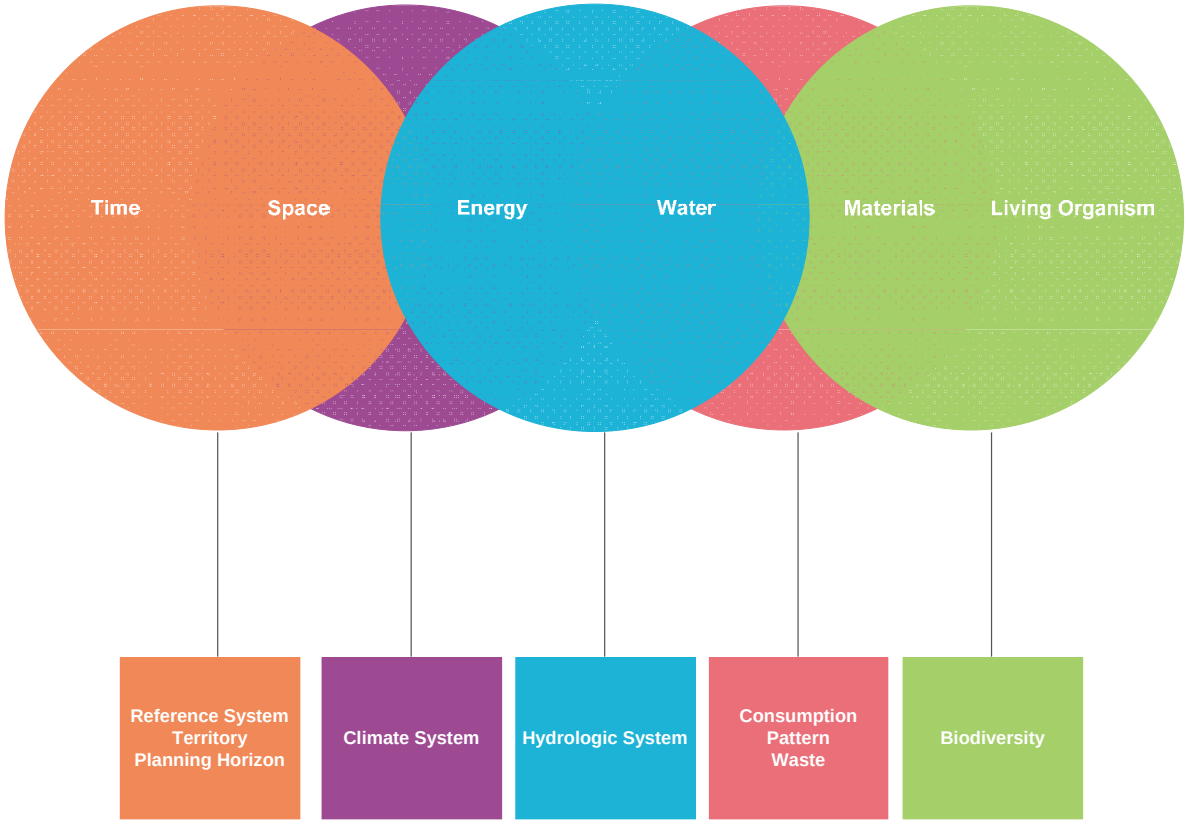
Coastal Landscapes
Provide Marine Resources & Touristic Areas

Urban Landscapes Consume Resources

Additionally Luxury Landscapes
for Pleasure and Sports:
Golf Courses …

…and Ski Areas

Landscape is Many Systems: Complex and Connected



Landscapes have Different [Resource-] Use Intensities and Balances

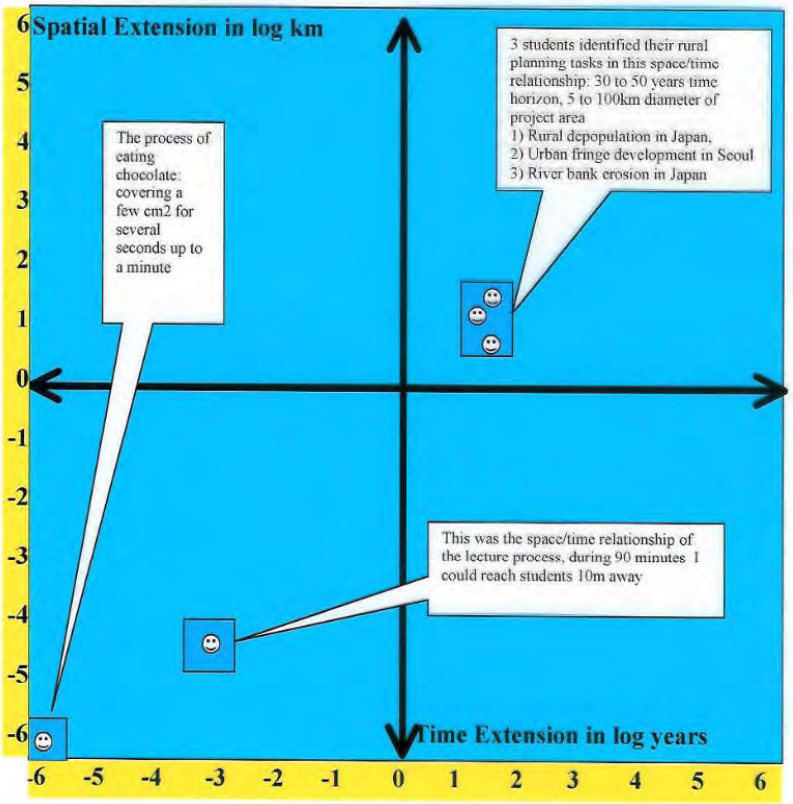
- Cities (Urban Landscapes)
  - Human living
  - Service activities
  - Industrial activities
- Cultural Landscapes
  - Original Agricultural Uses
  - Increasingly More Tourism Uses
  - Man is active in these landscapes
- Natural Landscapes
  - Man does not actively use these landscapes
  - But receives many [eco-system] services from them

Landscape Changes

- Originate from natural and cultural processes
  - During last five billion years until 70,000 years ago only natural processes
  - Then increasingly more human impacts with ups and downs
  - Since industrialization and in particular from the second half of the 20th century we observe a dominance of human processes.
- Processes we recognize relate to human beings
  - Number of people
  - Number of processes
  - Resource flow intensity
  - Resource efficiency of individual process
- Lead to question after sustainability
  - Sooner or later current processes will stop or reverse
  - A common vision of the meaning of sustainability
    - Population growth
    - Resource use growth
  - Demand continously for cultural innovations
    - To ensure the long lasting better ongoing of current practice of processes

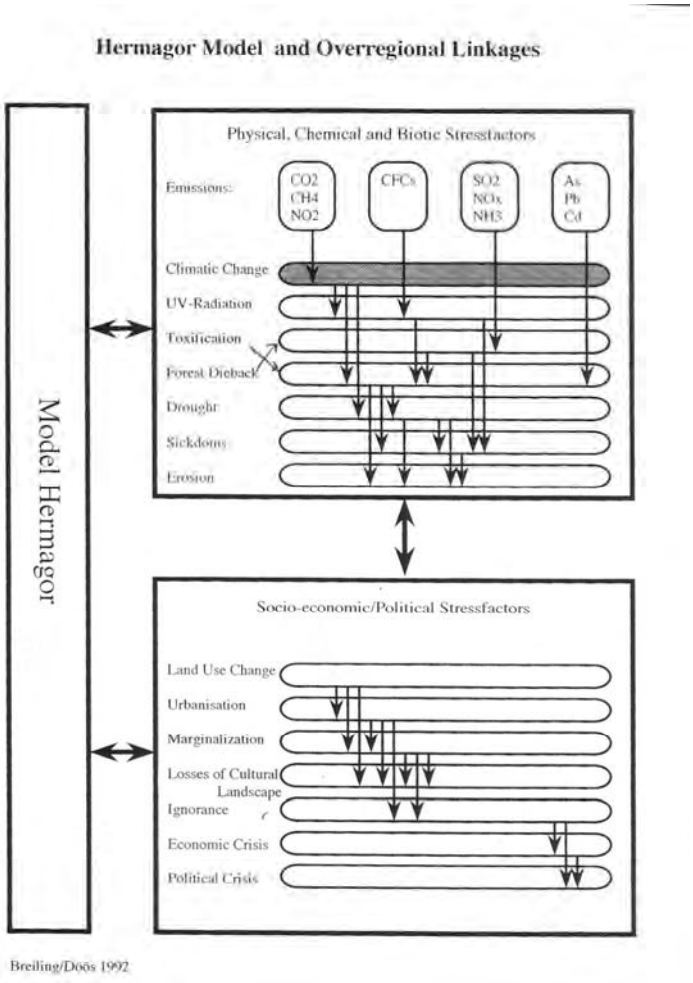
Every process has a space and time reference

- Landscape is never stable
- Billions of processes go on simultanously
- From natural geological or weather processes
- To cultural processes of humans living in it



Environmental and Socio-Economic Changes Affecting Landscape

- Since 25 years an unchanged Agenda
  - Climate Change
  - Land Use Change
  - Other Changes
- Here I use a figure developed during writing my Ph.D.
  - A regional landscape, the Austrian district Hermagor is vulnerable and forced to change and compensate from inside



Resilience of landscapes

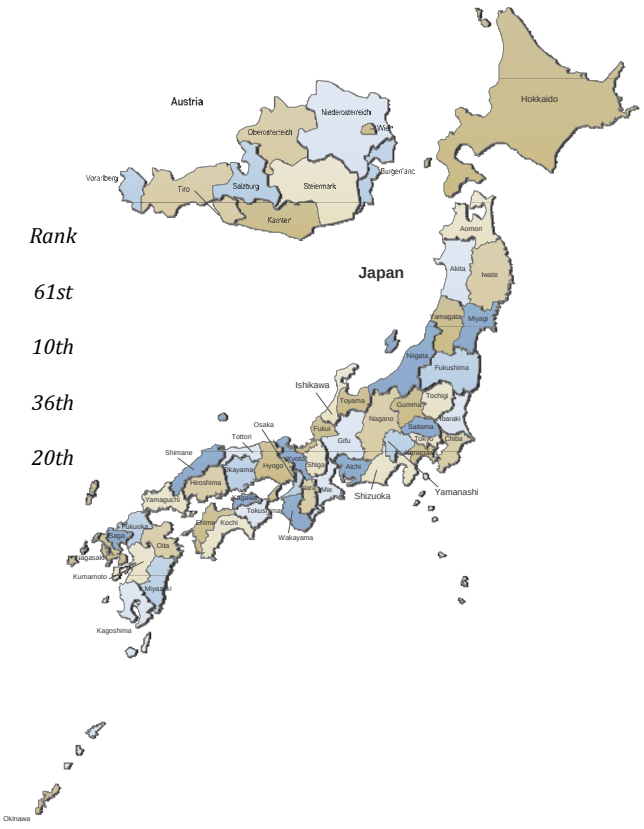
- Every landscape
  - Is unique in the mix of elements
  - Has given vulnerabilities and robustness
    - Reacts earlier or later to a change or threat
    - Solving a problem can lead to a follow up problem
  - Changes are not always in the same directions
    - Along processes changes can turn from positive to negative or vice versa
  - People living within have more or less means to react
    - Money, technical means, know how,
    - Political and social system, state power

Resource Use Intensities further increase

- Economic growth is additional resource use growth
  - So far there is no sustainable growth
  - No sustainable consumption
  - No smart shrinking in view
  - Major problems remain unsolved
- In society there is acceleration
  - Centers and favorable regions grow
  - Rural populations decline
  - Remote villages disappear
  - Traffic and travel increases

Austria and Japan

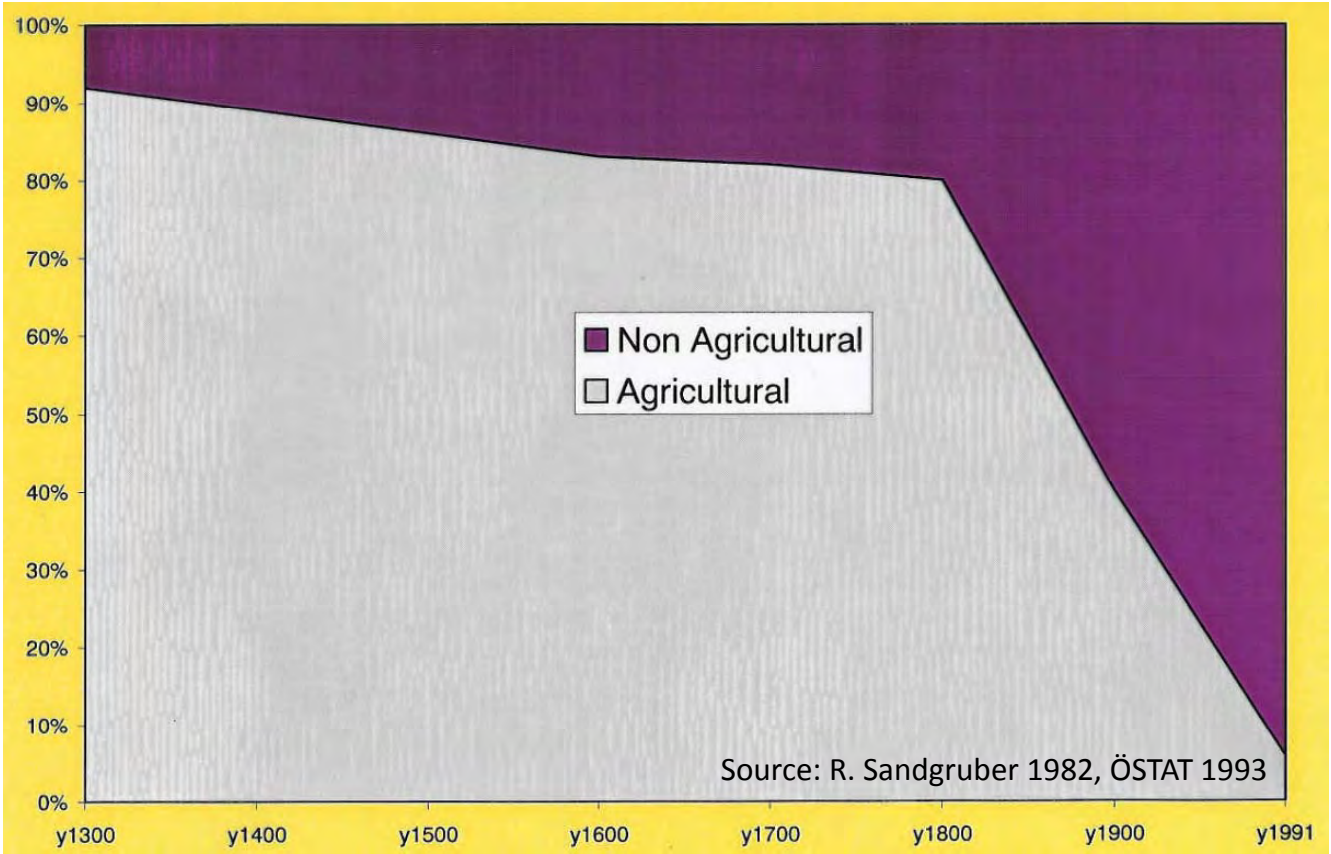
2017	**Austria**	*Rank*	**Japan**	*Rank*
Land in km^2	84,000	*113th*	377,972	*61st*
Population Million	8,8	*96th*	127	*10th*
Density	104	*106th*	336	*36th*
GDP in 1000 USD	45	*14th*	38	*20th*
Average height in m	950		350	



Intensity due to Population: Austria and Japan during last Millenium

Anno	World	Japan	Austria	% of world	% of world	Relation Jp-At
1150		6,84				
1500	500		1,5			
1600	580	12,27	1,8	2,12%	0,31%	6,82
1700	670		2,1		0,31%	
1750	750		2,73		0,36%	
1800	900		3,06		0,34%	
1850	1200		3,88		0,32%	
1900	1650	50	6	3,03%	0,36%	8,33
1950	2500	83	6,93	3,32%	0,28%	11,98
1960	3000	93	7,07	3,10%	0,24%	13,15
1970	3700	104	7,49	2,81%	0,20%	13,89
1980	4400	117	7,55	2,66%	0,17%	15,50
1990	5500	124	7,8	2,25%	0,14%	15,90
2000	6700	127	8,11	1,90%	0,12%	15,66
2010	7400	128	8,4	1,73%	0,11%	15,24

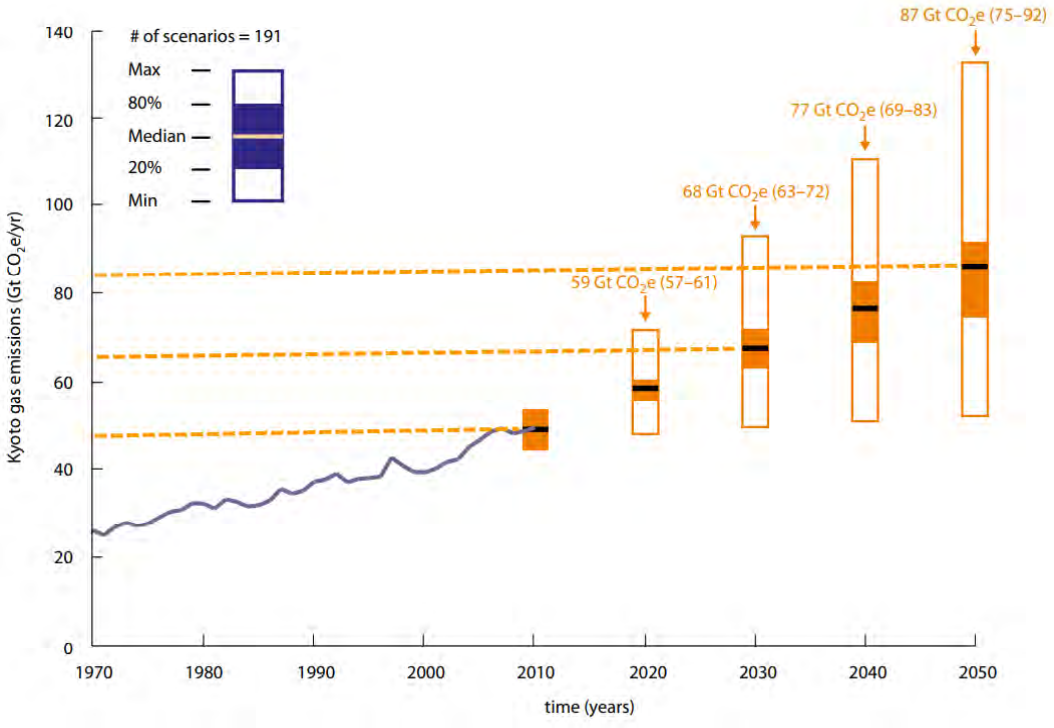
Decline of Agriculture in Lower Austrian Population



Mitigation Efforts: From Kyoto to Paris

- In 1997 there was COP3 and agreement on the Kyoto Protocol
  - Stabilize greenhouse gases at 1990 levels until 2012
- In 2009 there was COP15 and insight in Copenhagen that stabilization is impossible
  - Instead a maximum of 2°C warming target was established
- In 2015 there was COP21 and Paris Accord
  - Considered as a milestone
  - But trackback from USA in 2017

Global Emissions of Greenhouse Gases – Business like Usual



Source: UNEP 2014, The Emission Gap Report, p. 35, modified

Big Businesses (Global 500) Greenhouse Gas Emissions

- The world's 500 largest businesses collectively emitted over 5 gigatons
  - 10% of global emissions of CO^2e through operations and purchase of energy
  - represent around 28% of global GDP
    - reflect more broadly on how the broader economy is responding to the climate challenge
  - 1% increase during 2010 and beginning of 2015

Source: Thompson and Reuters (2016) REPORT ON TRENDS- GLOBAL 500 GREENHOUSE GASES PERFORMANCE 2010-2015

Modern Agricultulture and Food Consumption as Major Driver of Climate Change

- Globally 4% of GDP are due to agriculture
- Primary emissions due to agriculture are 10%
- Including all industrial inputs we reach a number far beyond this amount, appr. 25% with increasing tendency
- Less carbon sinks are available due to a global retreat from rural areas

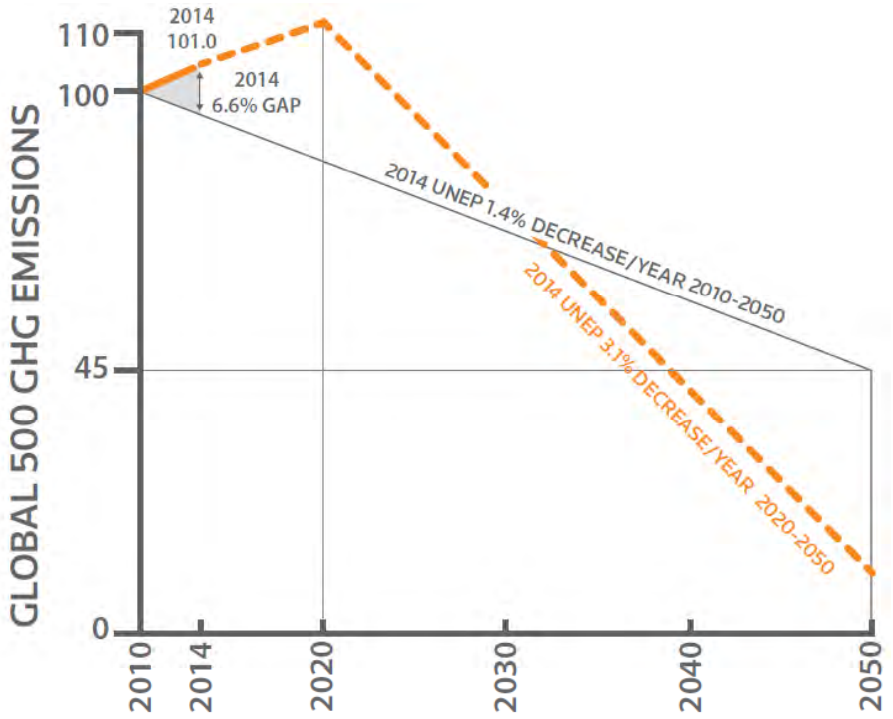
Tourism as a Major Driver of Climate Change

- Tourism contributes similarly to direct GDP like agriculture
  - 10% to global GDP including indirect earnings
  - 1.4 billion international trips in 2016
  - Some 6 billion domestic trips
  - In average 1 trip per person and year
- Tourism is considered to contribute directly with 5% to greenhouse gas emissions

2013 UNEP: 1.4% annual emission decline needed

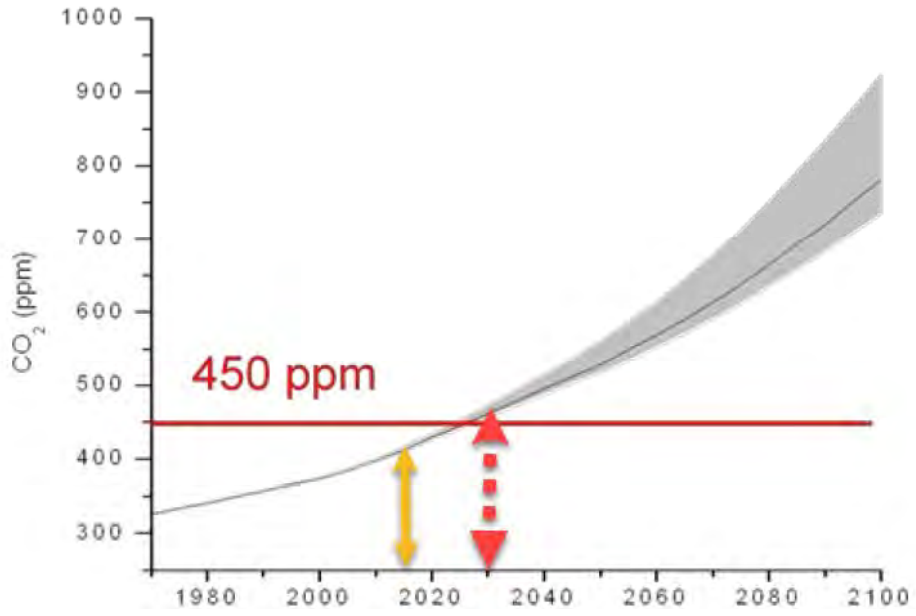
Or:

3.1 % annual decline during 2020 and 2050



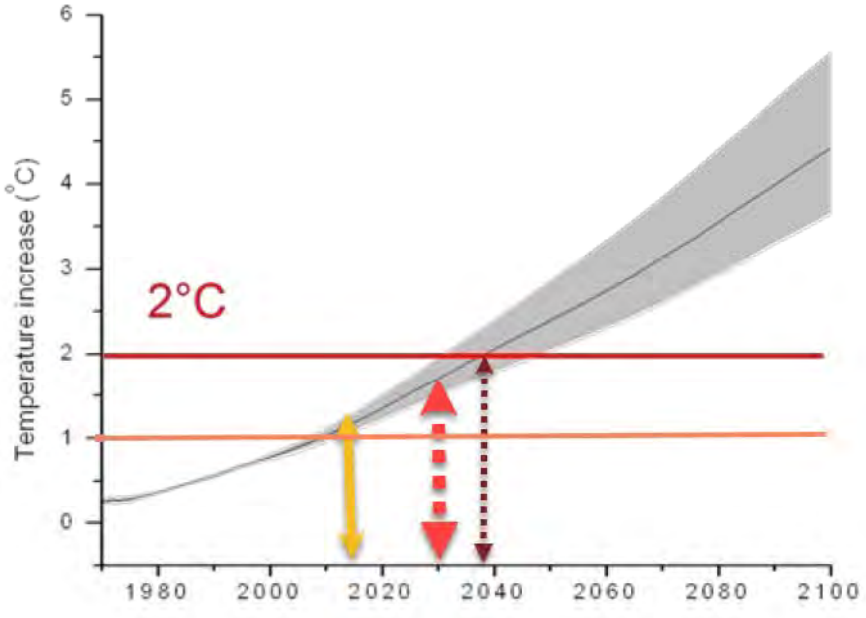
Source: Thompson and Reuters (2016) REPORT ON TRENDS- GLOBAL 500 GREENHOUSE GASES PERFORMANCE 2010-2015

Can we stabilize the CO2 concentration in the atmosphere?



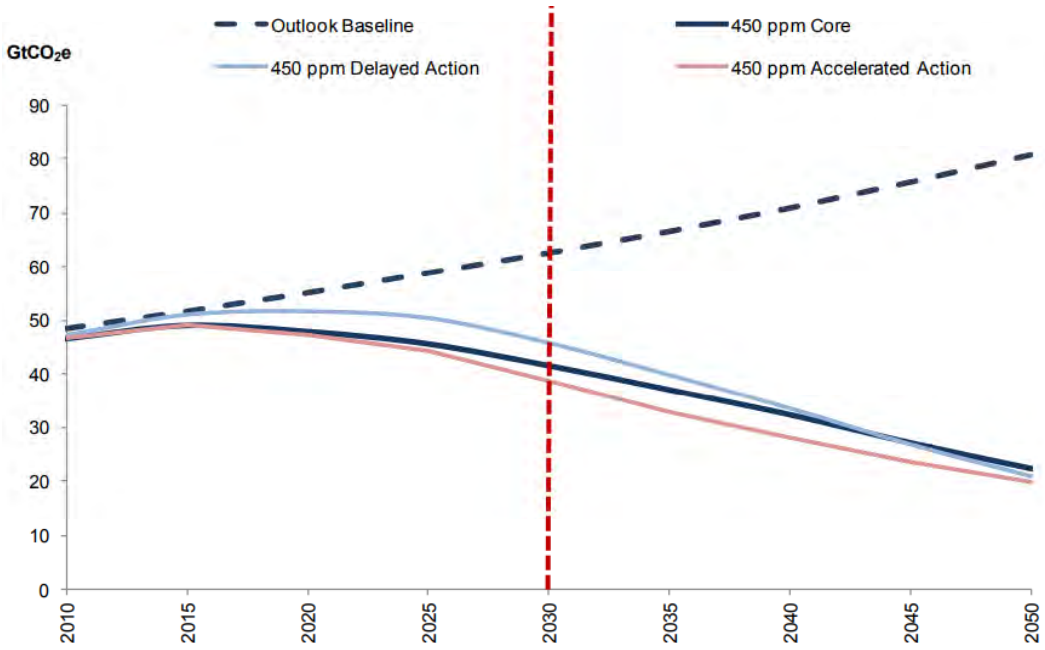
Source: The OECD Environmental Outlook Baseline Projections, Image Model, 2012, modified

Maximum of 450 ppm CO2 considered to stabilize warming at 2°C



Source: The OECD Environmental Outlook Baseline Projections, Image Model, 2012, modified

Stabilization of Atmosphere at 450 ppm



Source: OECD 2012, Environmental Outlook Projections, IMAGE ENV Linkages Model

Mitigation szenarios

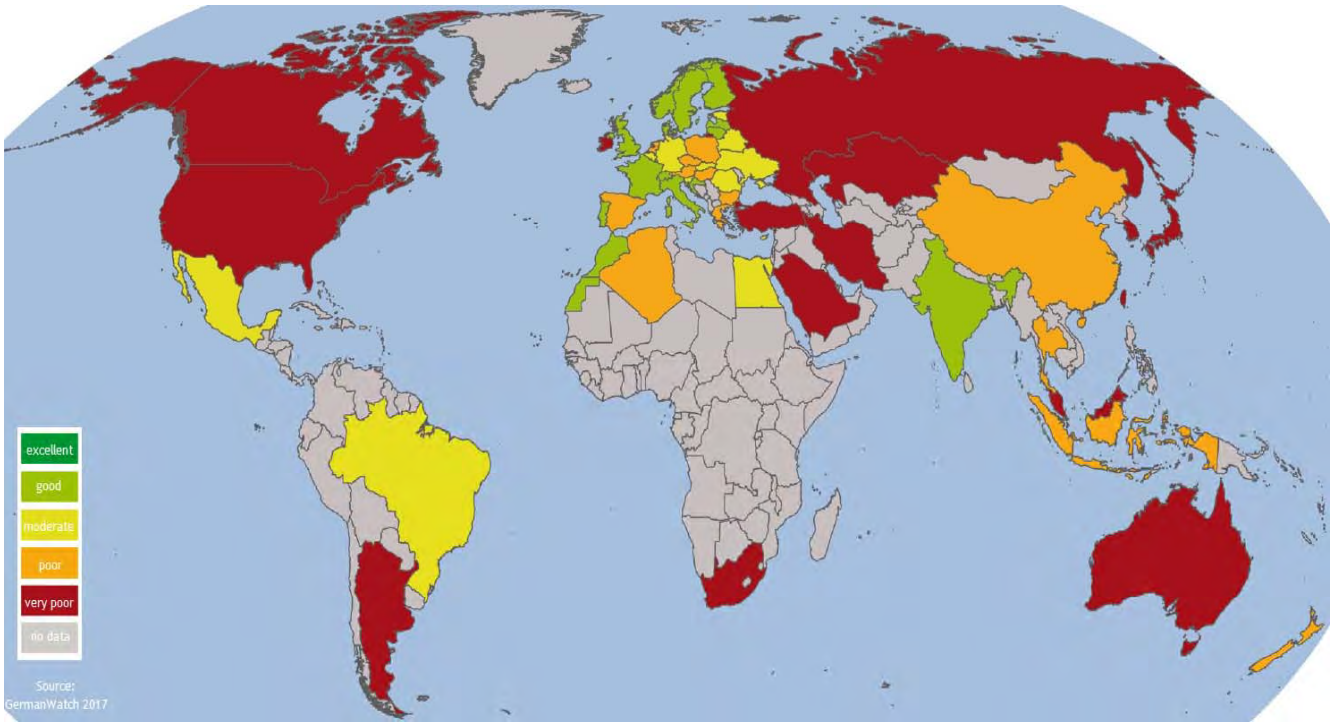
- All scenarios require immediate to fast actions
  - Tapping into less costly mitigation szenarios in 2012
  - To more demanding reduction efforts during this decade

Stabilization Requirements

- Emissions must peak before 2020
  - Highly unlikely: after 2025 considered as possible
- Concentration 450 ppm in atmoshere
  - An overshoot is expected before a reduction is likely
- A significant carbon prize
  - Carbon emission price trading assumes a price of USD 350.- in 2050
  - In 2016 it was USD 7.- or 2% of target value
- Ambitious mitigation lowers the risk of catastrophic climate change
  - Disasters and damages and losses due to disasters will increase

Source: OECD 2012, Environmental Outlook Projections

Evaluation of Efforts to Counter Climate Change



Speed of warming and change accelerates!

- Despite all efforts to mitigate climate change the problem increases
- The speed of warming and change accelerates
- Comparison to a car on the highway if we currently drive 100km/h :
  - In 1950 we start slowly with 20 km/h
  - During 1950 and 1990 we accelerated to 60km/h
  - During 1990 and 2010 we accelerated to 90km/h
  - During 2010 and 2030 we drive 130 km/h
  - During 2030 and 2050 we will drive 180 km/h

We will observe ever more adjustments in urban landscapes

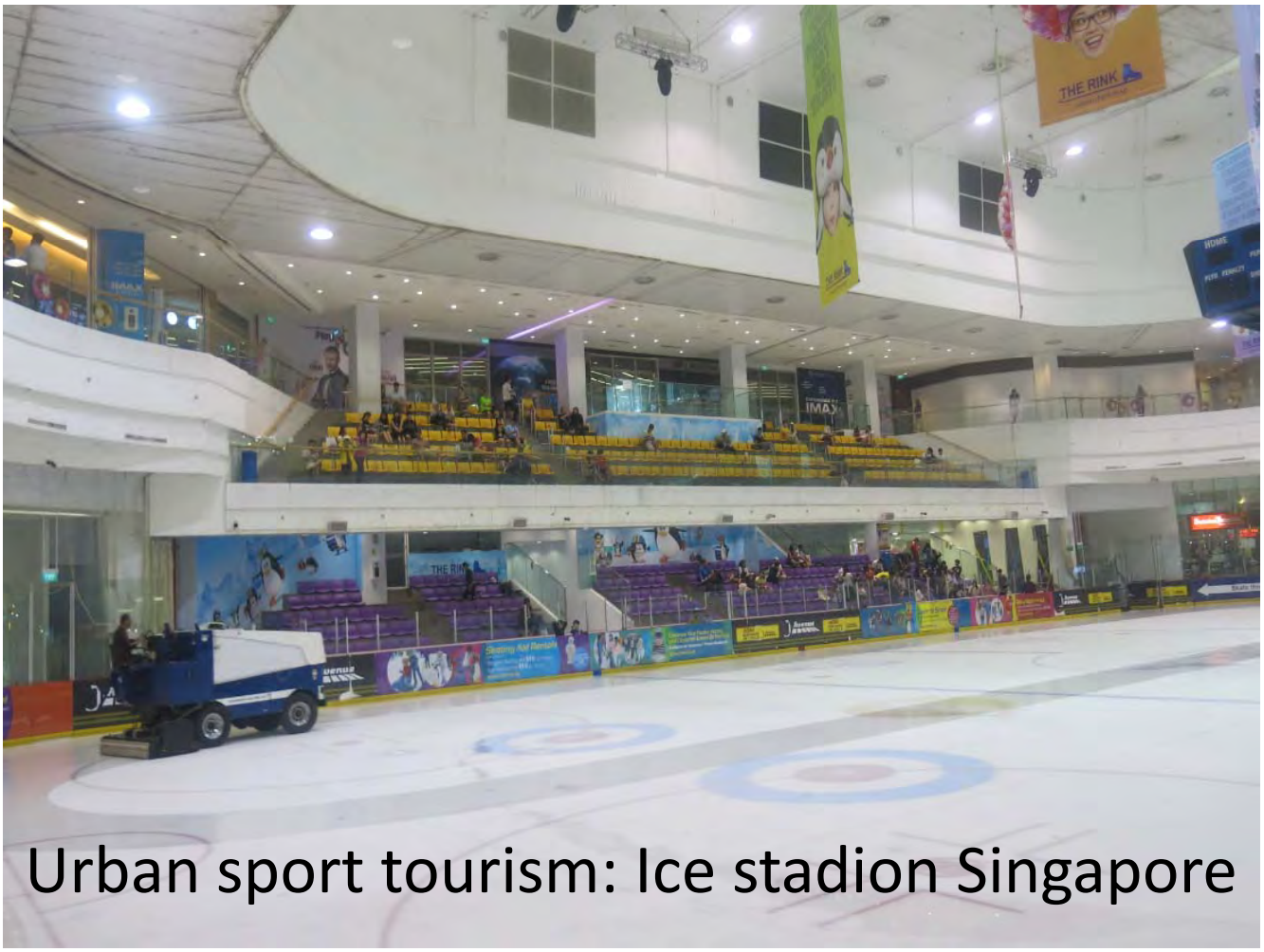
- Urban landscapes will merge to metropolitan regions wherever feasible
  - They become closely linked in a powerful, global network
    - The interact with ever more and frequent exchange of resources
    - They become more energy intensive and contribute to higher degree to global warming
  - Agriculture will become increasingly more an urban activity
    - Small family farms will massively go down all over in the world
    - Farming will increasingly become the business of multinational companies
  - Tourism will become to a higher degree an urban activity
    - Smaller resorts form elements of huge touristic complexes
    - The cost to reach more remote destinations will become overproportionally expensive and of exclusive character

Urban development Shenzhen, China
• In 1985 a fisher village with 50,000 people
• 2017 there are 12.5 million with highest per capita income of China

Urban Agriculture near Busan

Smart Swine Farm near Busan

Urban development Singapore



Urban sport tourism: Ice stadion Singapore

Snow city Singapore

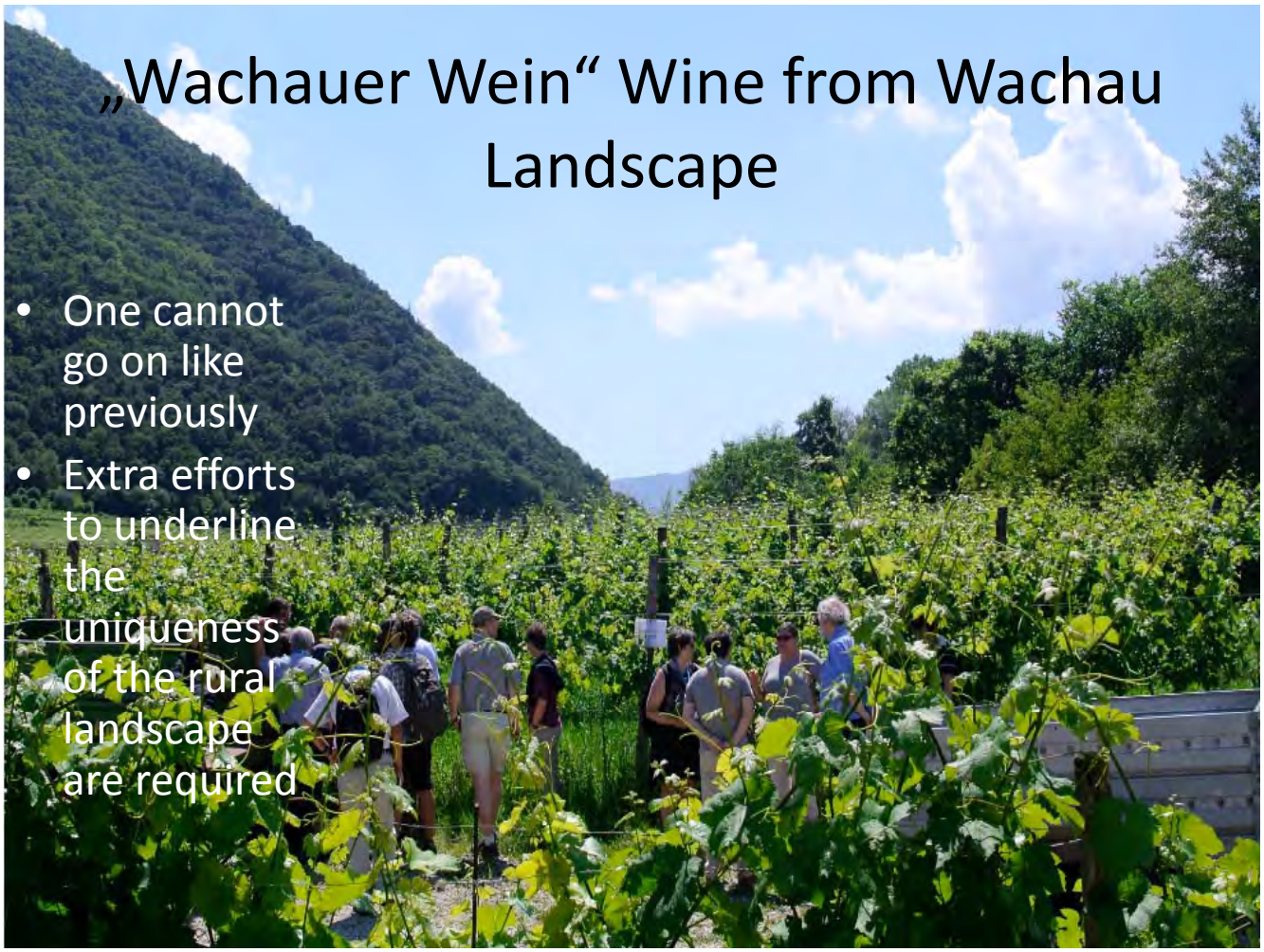
Artificial exotic environments for nearby escape

We will wittness the loss of rural landscapes and additional changes

Marginalization of economic output

- Search for higher value landscape income

„Wachauer Wein“ Wine from Wachau Landscape



- One cannot go on like previously
- Extra efforts to underline the uniqueness of the rural landscape are required

Since 1990 „Wachauer Beef“ as Trademark

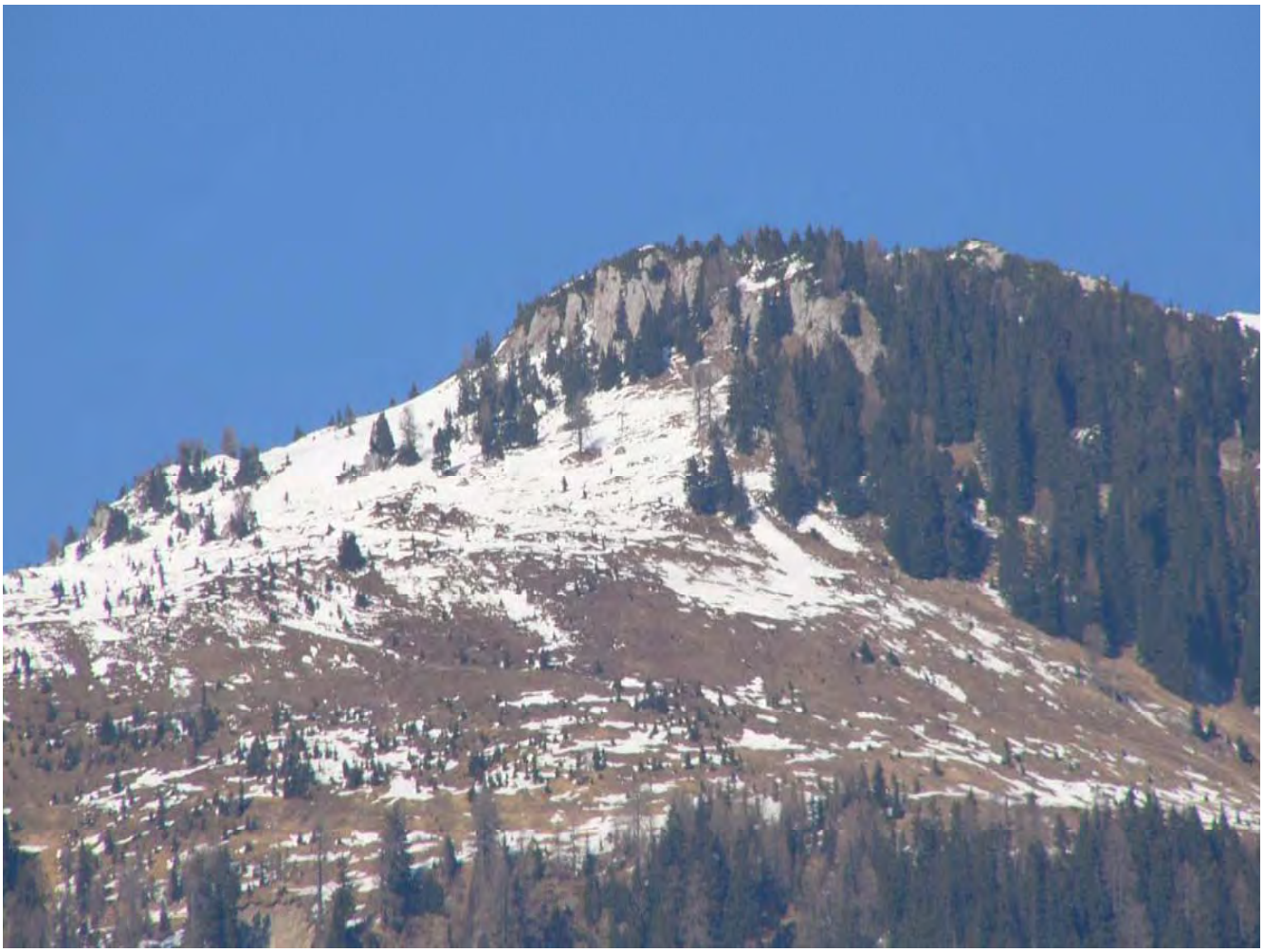
- Only special rural landscapes will continue to be used

Skiing landscape in Austria

- Austria has about 50 large high class ski areas
- Additional 300 smaller ski resort
- Original agricultural use substituded by tourism

Intensification through climate adaptation

- Austria invested heavily into snow making
- Get more skiiers from global market



(Semi-) Natural landscapes
will grow due to large
lands coming out from
rural uses

More environmental stress on natural landscapes

- Some eco-system services will get limited
  - Disaster prevention and disaster resilience
  - Bio-diversity
  - Water quality and quantity

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