VIRGEN

An Alpine community with high quality of life faces multiple (climate change) challenges.
An Alpine community

• located in East Tyrol, south of the main chain of the Alps
• 2199 inhabitants
• 8881ha (= 21,945 acres)
  – 5600ha agricultural and recreational areas
  – 2500ha forests
• ~ 1200 m above sea level
• mean annual temperature 6.4°C
• average summer days (>25°C) 18.8/yr
• average days with more than 10 hrs of sunshine 45.5/yr ; > 2000 hrs sunshine/yr
• average annual precipitation 819 mm (= 32 in)
• average days with snow cover 109.4/yr
High quality of life

• Main sectors: agriculture and tourism (Currently: climatic health resort, very sunny)
• High quality of the environment and nature
• Good infrastructure (local suppliers, recreational areas)
• High engagement in community life and voluntary organizations
• Inhabitants value the sense of community, political participation is encouraged
• Educational facilities up to Grade 8 and for adults
• High efforts regarding climate change mitigation (e.g. subsidies for solar panels, e5 energy label)
Community challenges

- Demographic change
- Out-migration
- Aging community
- Community with low financial resources
- Lack of local employment, scarcity of jobs in the region, high level of commuters
- Too little entrepreneurial thinking and acting
- Decreasing summer tourism and increasing winter tourism
Active climate change mitigation

• Virgen has been committed for more than two decades to environmental and climate protection and in particular to the energy issue
• Since 1991 it is part of the Hohe Tauern National Park
• Climate Alliance Community
• Energy Conscious Community (European energy award gold)
Mitigation activities

- **Energy saving**: support programmes; building renovation; awareness raising
- **Solar energy**: Thermal solar installations (4,600 m²; 1,840.00 kWh/yr); Photovoltaic installations (27 systems; 14,000 kWh/yr)
- **Wood**: Village district heating system (wood chips); support for wood-fired boilers – 94 installations
- **Water**: 3 small hydropower plants (in total 2,686,000 kWh/yr)
- **Geothermal energy**: about 25 installations
Climate change

Model calculations for 2050 (region of East Tyrol)

Temperature
• Temperature increase of about 2.3 - 2.5° C
• Increase of summer days (days with > 25° C) up to 3-6 days/year
• Decrease in frost days (days with daily minimum temperature <0° C) up to 23-25 days/year.

Precipitation
• Annual precipitation remains fairly constant
• Decrease in summer precipitation and increase in winter precipitation
• More intense rainfall (particularly small-scale) and increased rainfall variability may occur in the summer

Snow cover duration
• Decrease in the snow cover duration by up to 30 - 50%.
Anticipated challenges

- Forestry
- Buildings/Infrastructure
- Agriculture
- Water
- Biodiversity
- Tourism
- Natural hazards

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Natural hazards

• Extreme weather events and melting permafrost
• Increased mudslides, heavy rain, storms, droughts, etc.

Ecosystems and biodiversity

• Changing habitats along climatic zones, altitudes and humidity
• Change in number of species, species composition in habitats
• Changing river ecosystems, reduction of wetlands
• 45% of all Alpine species could be extinct by 2100
Agriculture

• Longer vegetation periods
• Better use of water stored in soil during winter
• Less precipitation in summer → droughts → uncertain yields and changes in fodder quality
• Heavy rain falls → soil erosion

Forestry

• Alpine tree line changes → Possibility of increases in forest growth
• Rising temperatures, longer vegetation periods and higher evaporation → water demand
• Mild winter, longer summer → spread of bark beetle
• Climate change affects protective forests, communal benefits and forest recreation
Tourism

• Challenges for winter tourism, opportunities for summer and autumn tourism through changing recreational patterns → recreation in cooler areas with good air quality
• Changing demand and supply of energy and water for tourism

Health

• Increasing UV-radiation through reduction of stratospheric ozone
• Spread of diseases (e.g. ticks)
Infrastructure and buildings

- Temporary failures or damages to transport infrastructure and housing areas
- Long-term damages (streets, electricity, hiking routes, etc.)
- Less days of heating
Adaptation to climate change

Avoiding negative impacts

• Active engagement with the challenges
• Education and training for members of support organizations
• Awareness raising, information
• Irrigation systems, storage systems
• Optimise early warning systems
• Improve emergency services
• „Green“ construction
• Prepare for emergencies
Adaptation

Use the opportunities

- High altitude will be attractive for tourists
- Advertise regional specialities
- Alternatives for agriculture (fruit cultivation)
- Plant trees suited to future climate (e.g. deciduous trees)
- Irrigation systems
- Return to using steep meadows for making hay
Thank you for your attention

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