Transition Scenarios for México*

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Navigating the Climate Just Transition in a low Growth Macroeconomic Context: The Critical Role of Ministries of Finance

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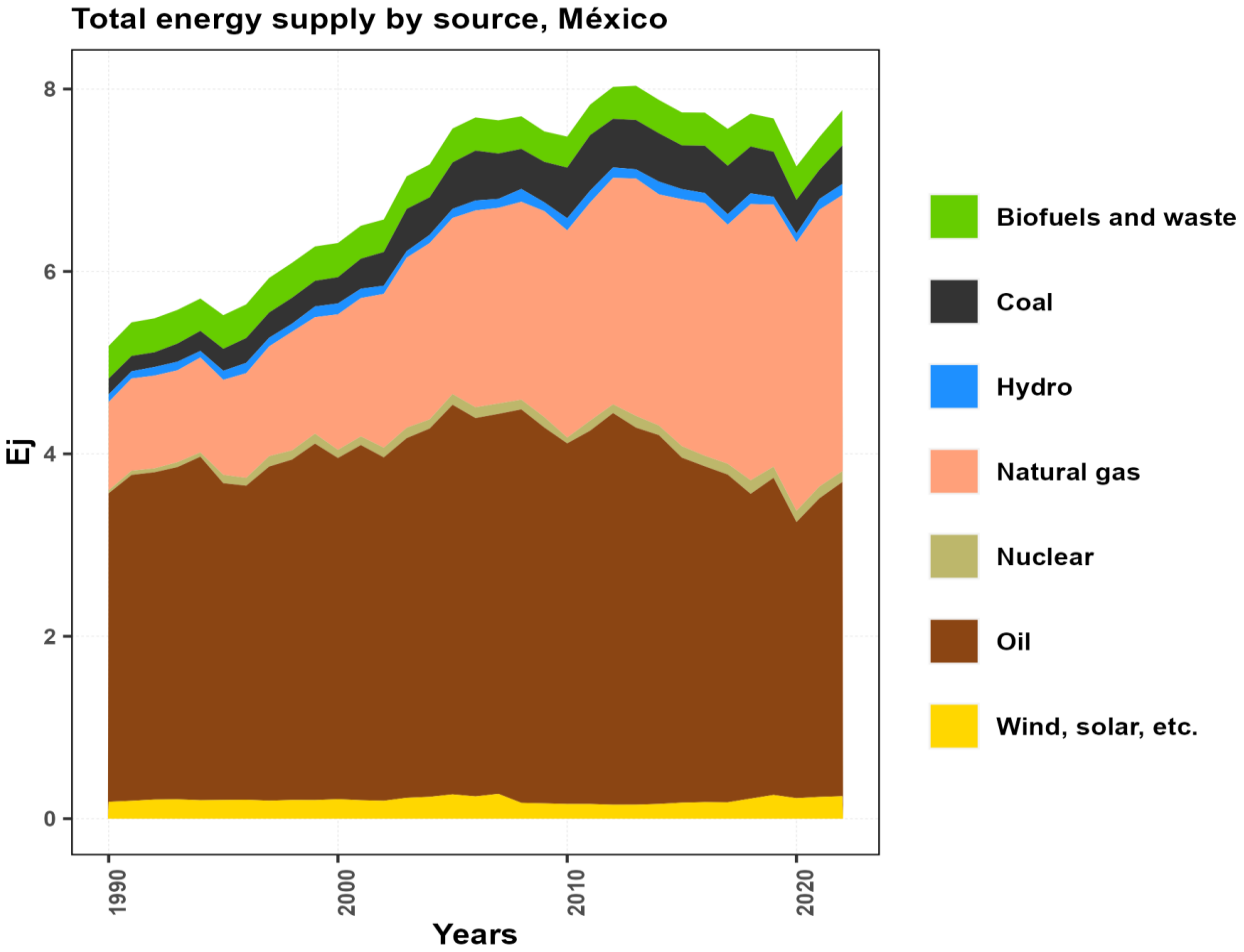
* The views expressed here are those of the authors and do not represent the views of Banco de México or its board.

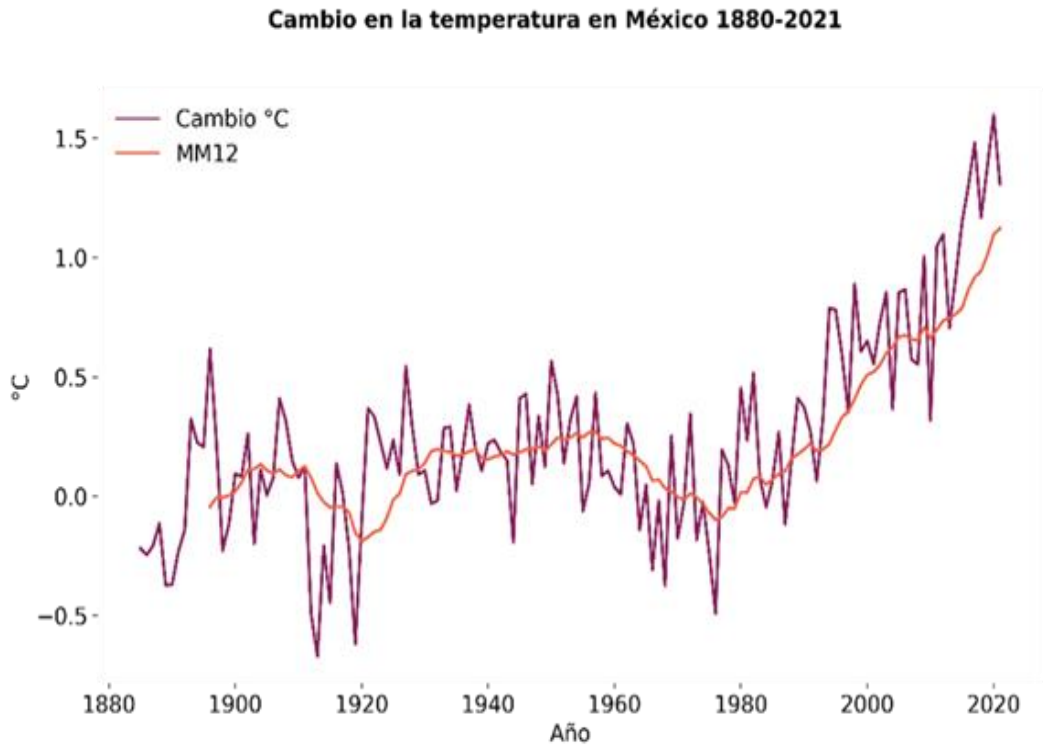
Outline

- Motivation
- Climate scenario analysis
  - Pilot excersise
  - CFS scenarios and Suit of models
  - Main results of GCAM
  - Climrisk
  - Next steps

Motivation



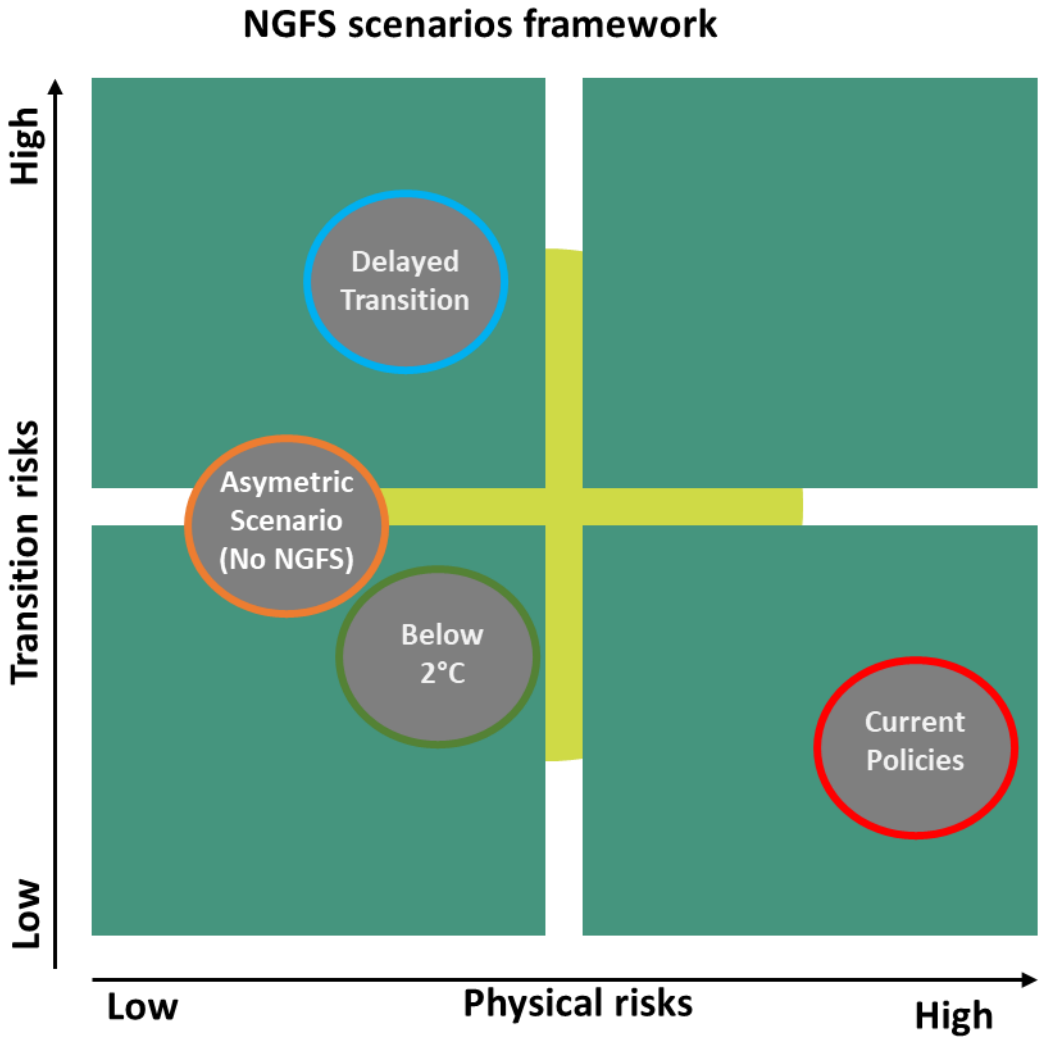
Source: IEA (2023), Energy Statistics Data Browser, IEA, Paris https://www.iea.org/data-and-statistics/data-tools/energy-statistics-data-browser



Source: Own elaboration based on data from Instituto de Investigación en Cambio Climático de la UNAM

Scenarios for Mexico approved by the Committee on Sustainable Finance (CSF):

- **Below 2°C (NGFS)**
- **Current Policies (CP), >3°C (NGFS)**
- **Delayed Transition (NGFS)**
- **Asymetric Scenario (No NGFS)** the rest of the world has Net Zero Emissions targets (1.5°) while Mexico continues
- with Current Policies.



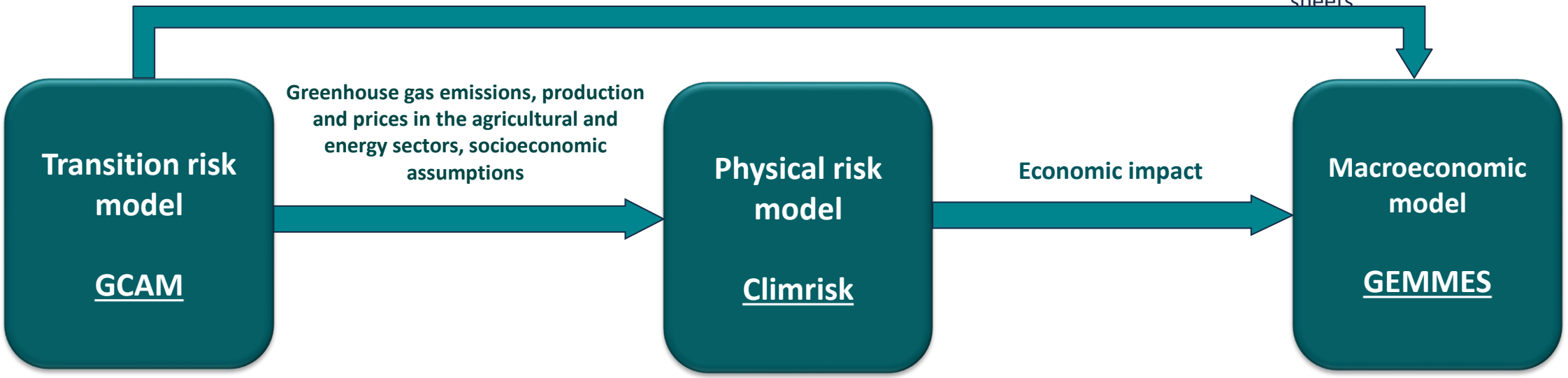
Positioning of scenarios is approximate, based on an assessment of physical and transition risks out to 2100.

Models suite

GEMMES calibration

Data:

- System of national accounts
- Balance of payments
- Remittances
- Taxes
- Banking sector and central Banks sheets



GCAM

Outputs: GHG emissions by economic sector, shadow carbon price, production and consumption by nine energies, electricity generation by technology, costs and prices, transportation services, energy used by transportation technology and fuel used, land use (e.g. biomass, cereals, forest), water extraction and consumption by sector and by basins, water prices and water costs by basins, among others.

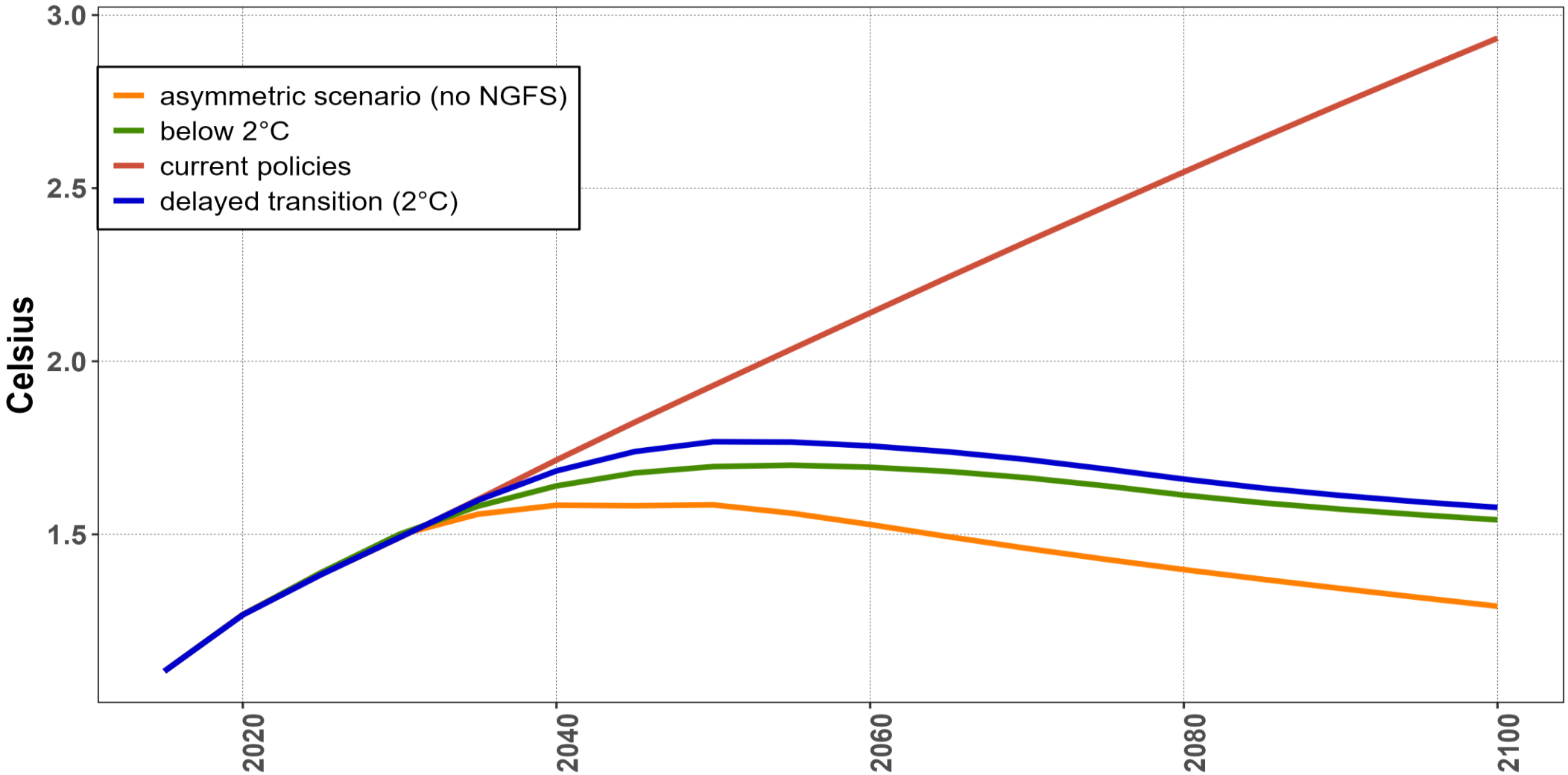
Physical risk

Outputs: Vulnerability, impacts and risks at a spatial resolution of about 50km x 50km for the whole world.Combining probabilistic global climate change scenarios with local warming in urban areas produced by UHI to generate estimates of economic impacts of climate change and dynamic uni- and multivariate risk measures.

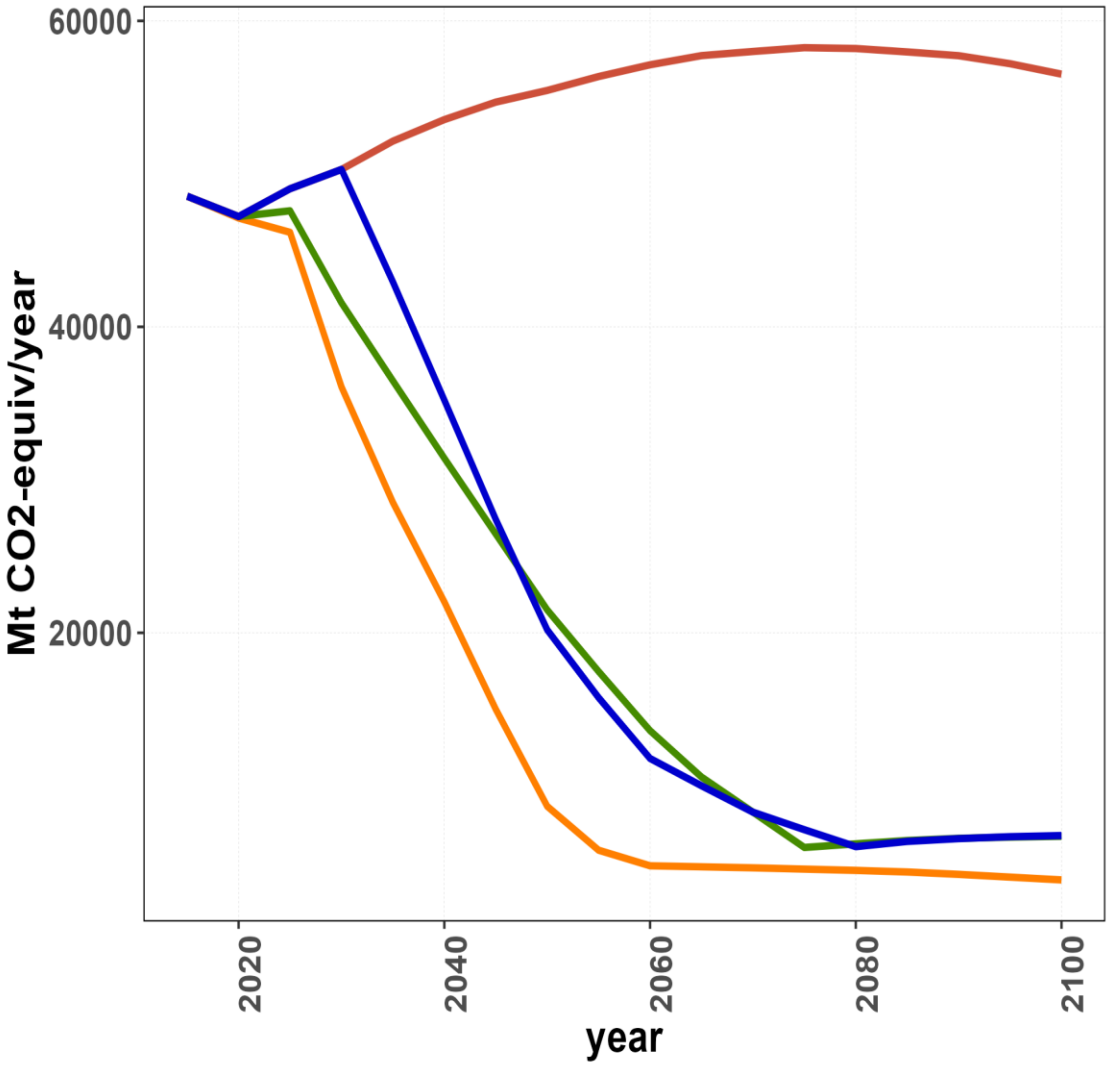
Macroeconomic model

Outputs: Macroeconomic variables, such as reserves, nominal/real exchange rates, social contributions, benefits, household debt, government deficit and debt, GDP, current account balance, gross/net foreign exchange reserve position, international investment, unemployment, among others.

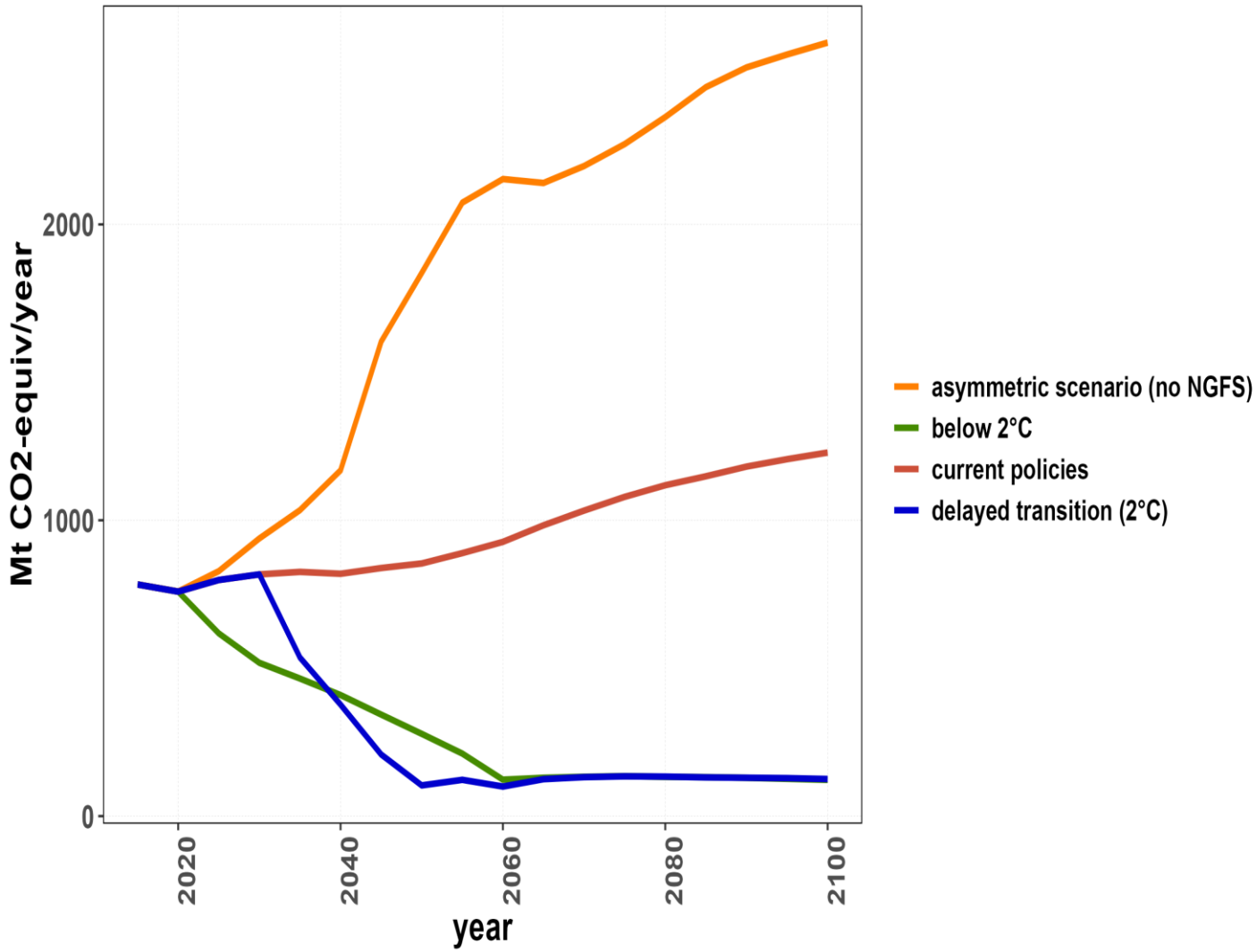
Global average temperature compared to pre-industrial levels

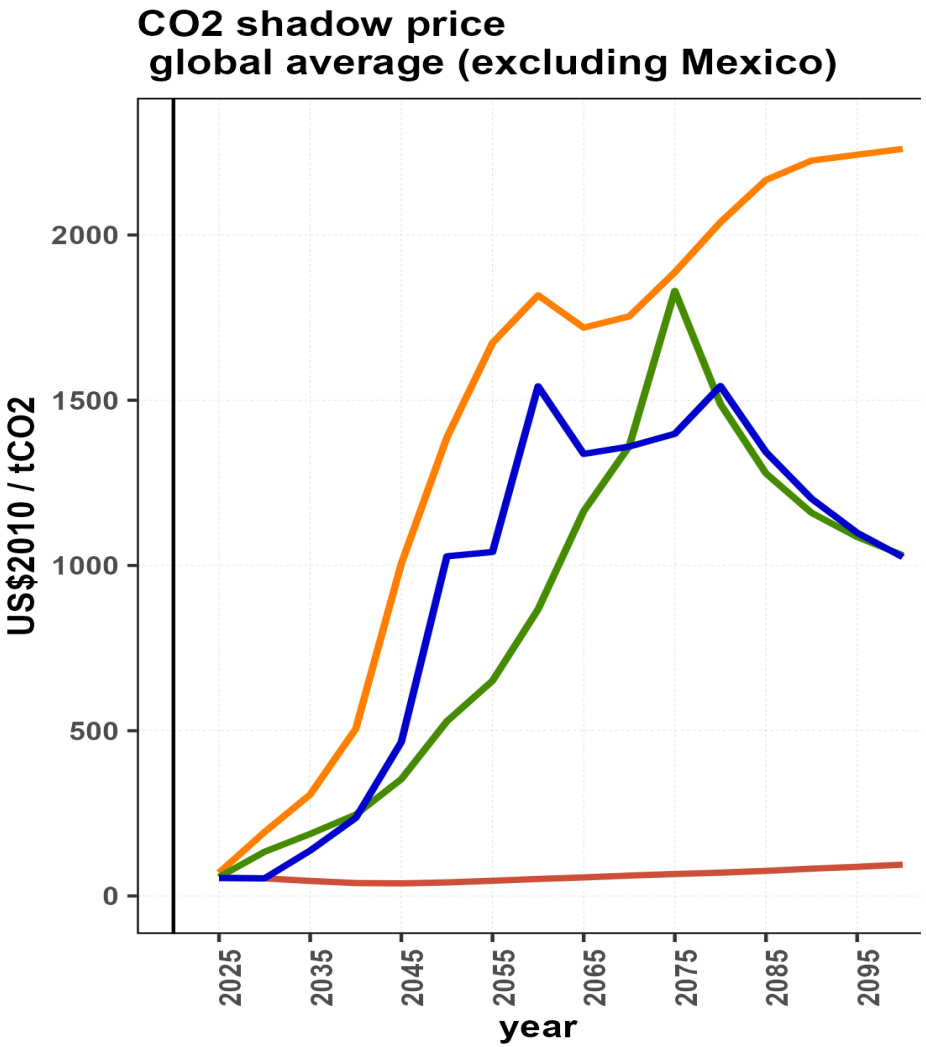


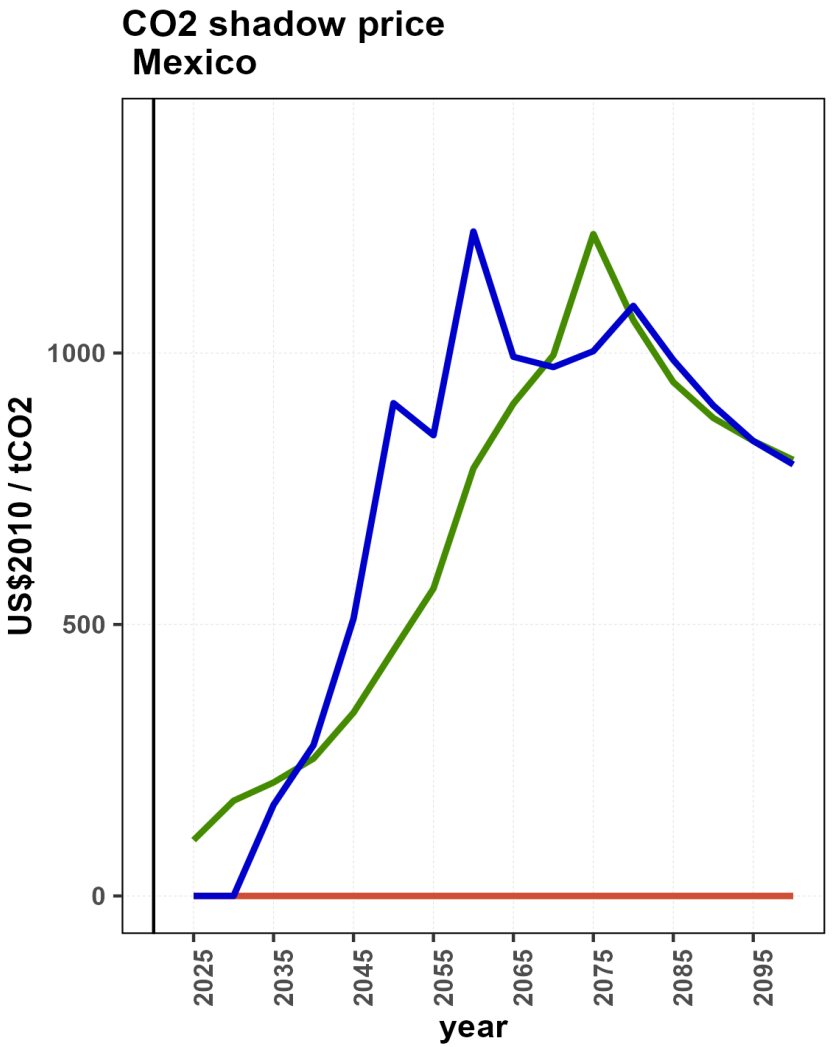
Global GEI Emissions



GEI Emissions, Mexico

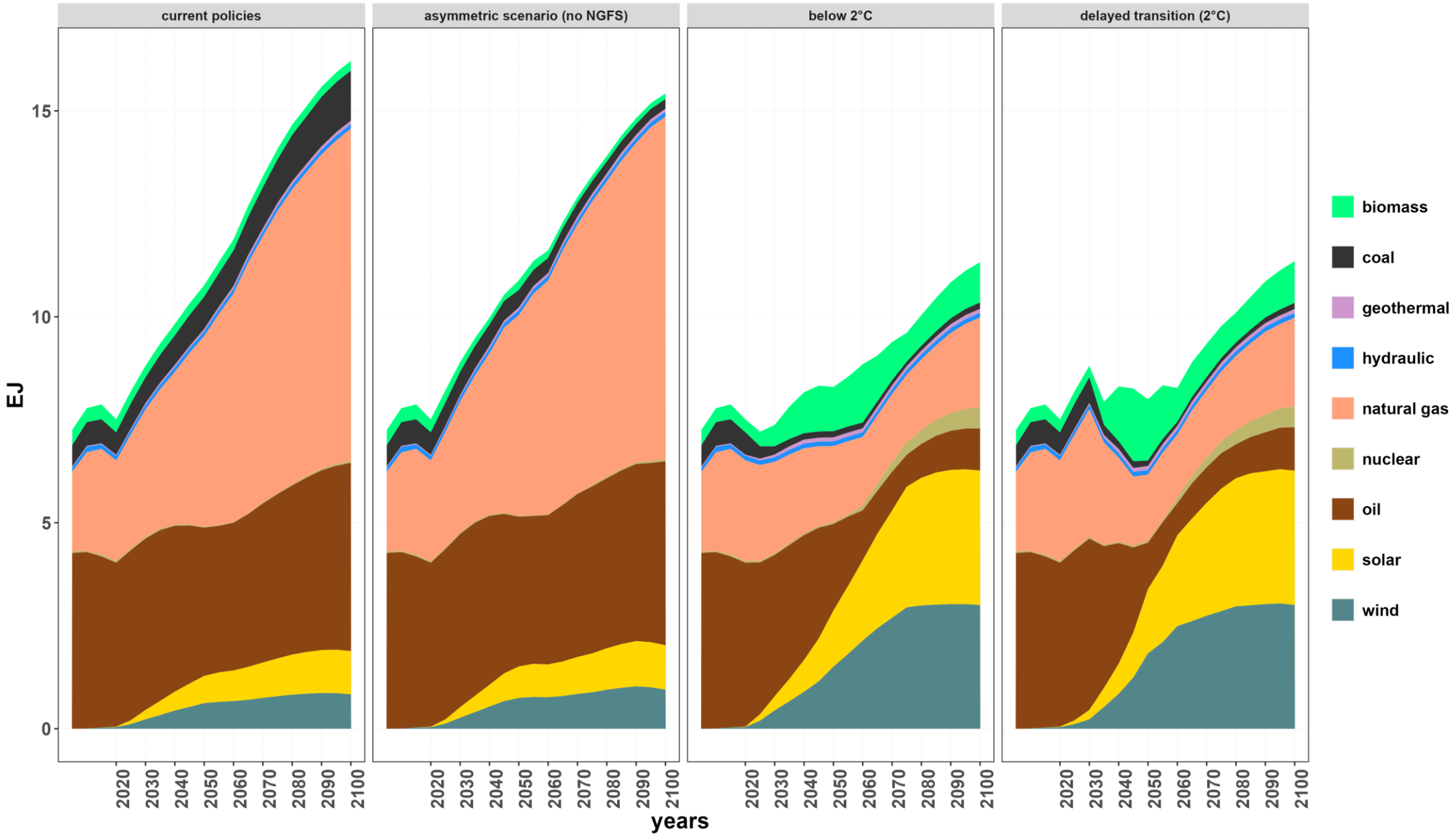



CO2 shadow price
global average (excluding Mexico)
US$2010 / tCO2
2000
1500
1000
500
0
2025
2035
2045
2055
2065
2075
2085
2095
year

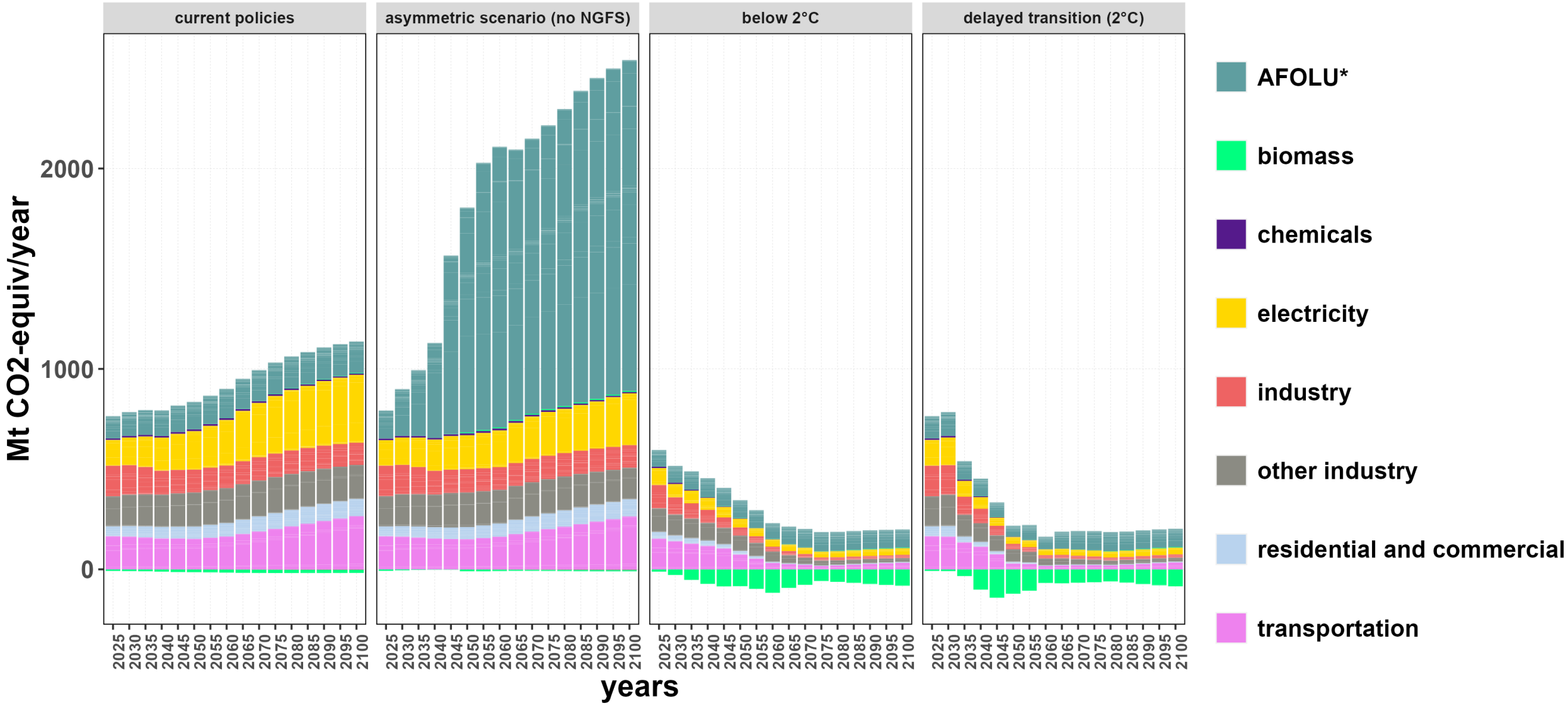

CO2 shadow price
Mexico
US$2010 / tCO2
1000
500
0
2025
2035
2045
2055
2065
2075
2085
2095
year


asymmetric scenario (no NGFS)
below 2°C
current policies
delayed transition (2°C)

Primary Energy, Mexico

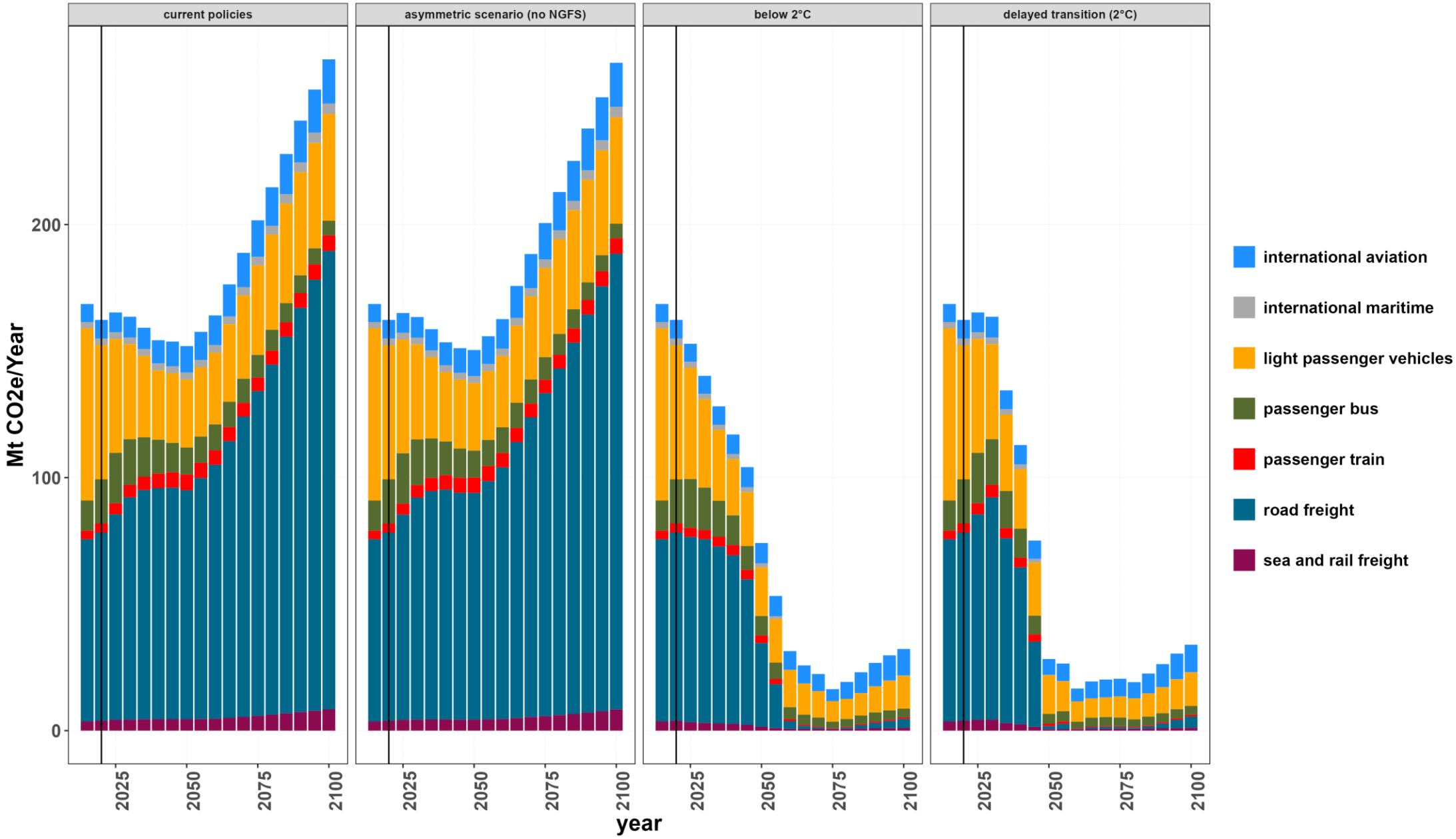


GHG emissions by sector - Mexico

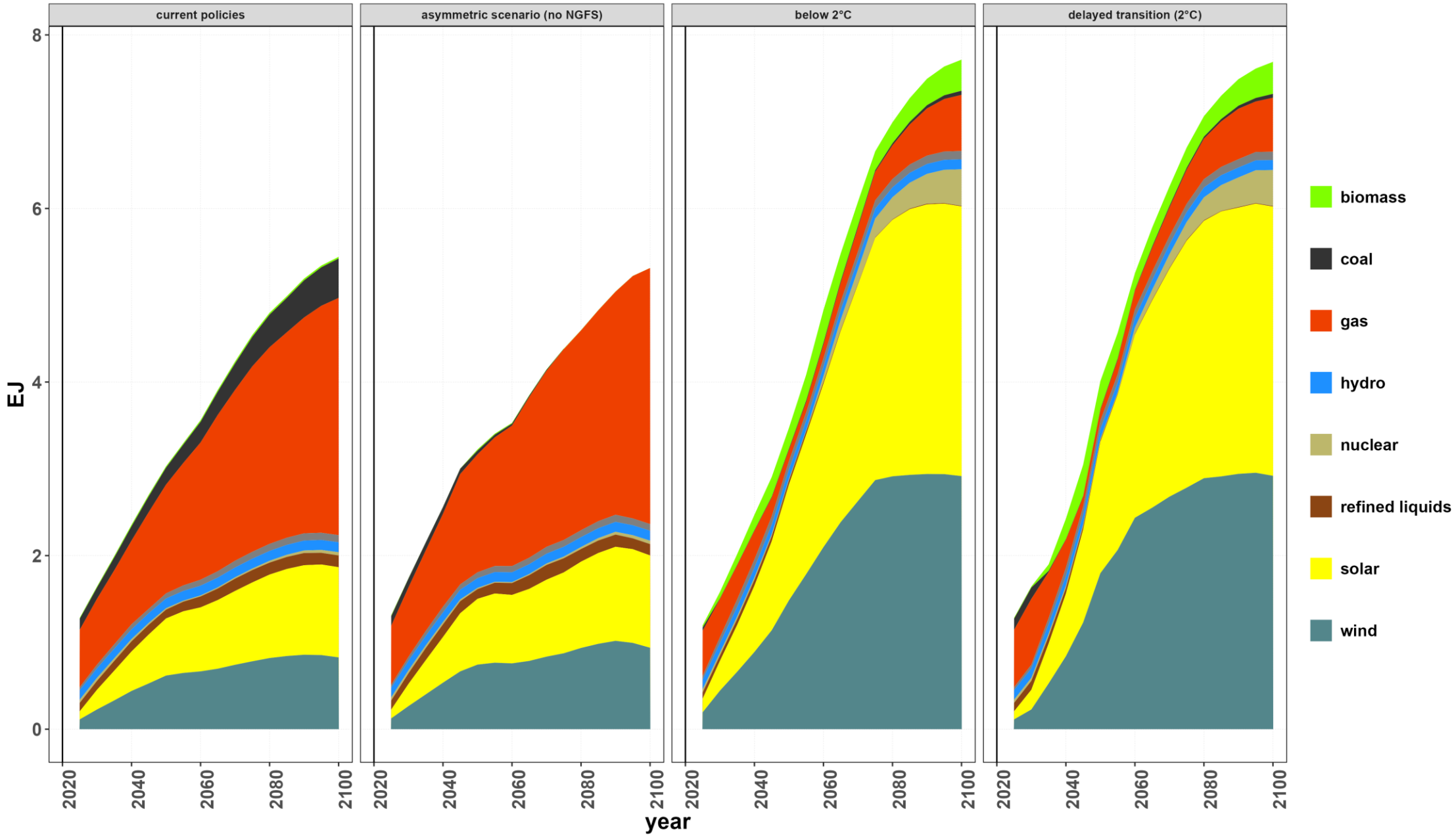


*Agriculture, Forestry and Other Land Use

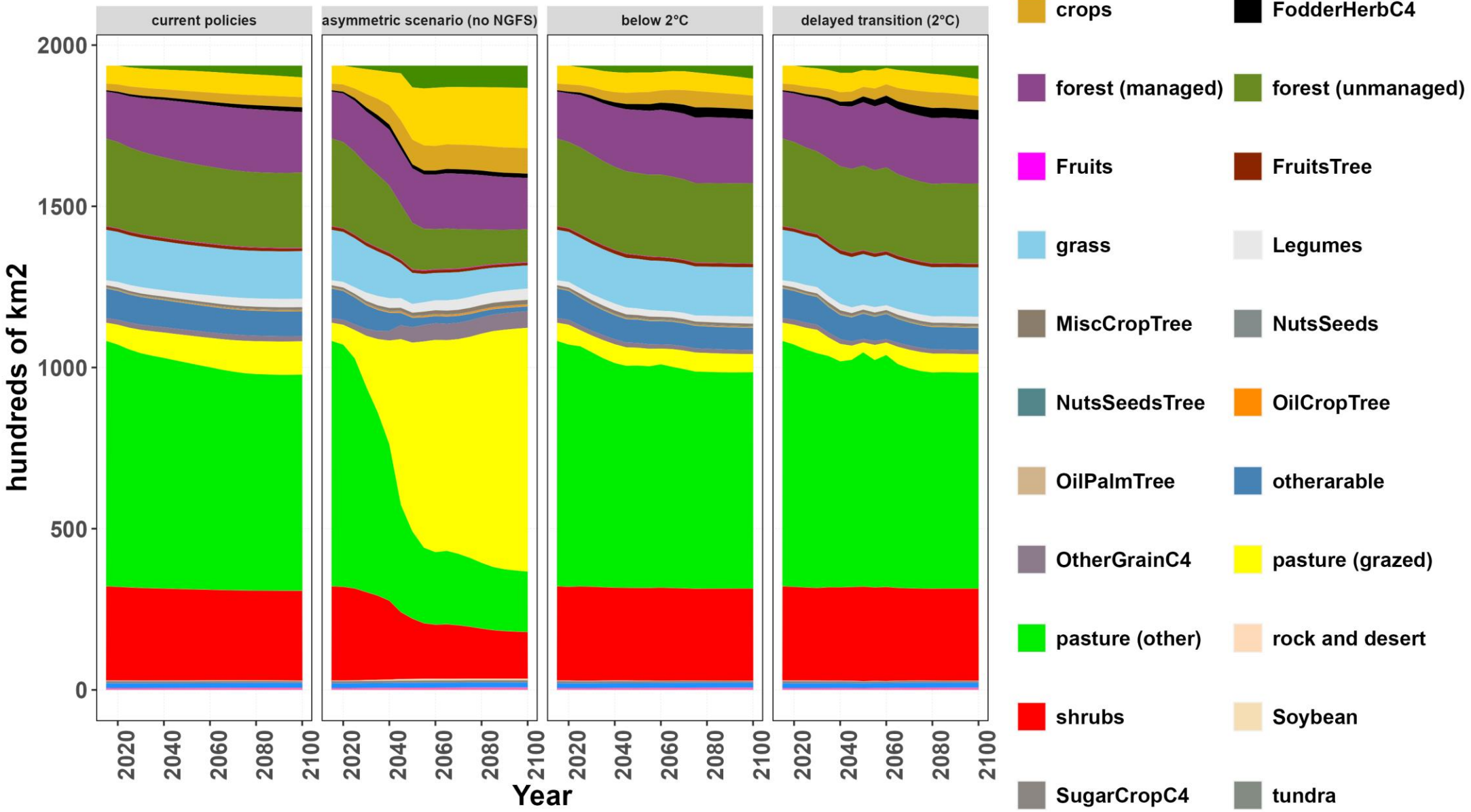
GHG Emissions - Transportation, Mexico



Electricity, Mexico



Land use, Mexico



WATER DEMAND

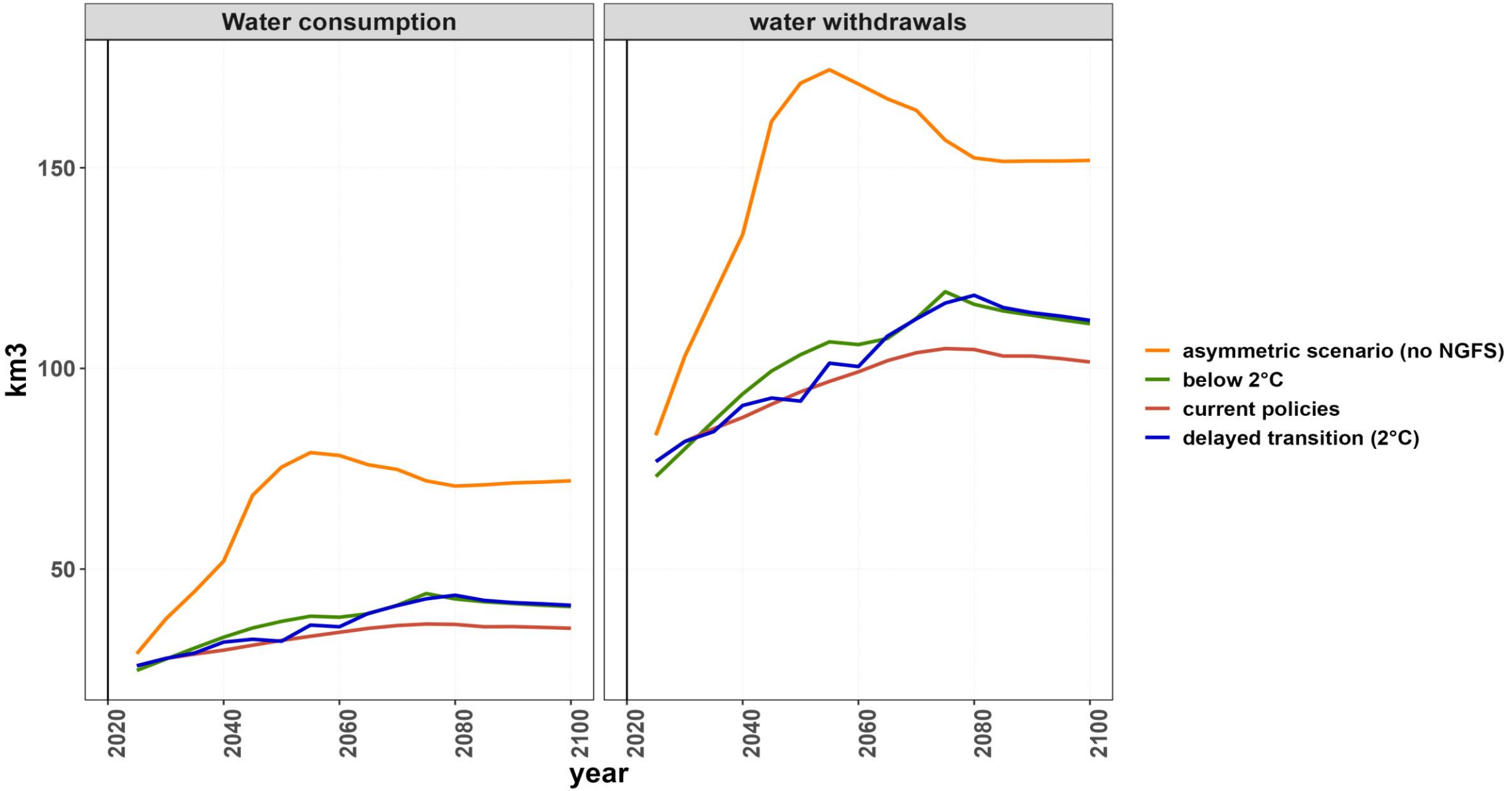
Water withdrawals

- Total amount of water taken from a water source (such as rivers, lakes, or groundwater) for any purpose (Vickers 2001). It includes both consumptive and non-consumptive uses. Non-consumptive uses typically involve returning the water back to the source after use, such as for cooling in thermal power plants.

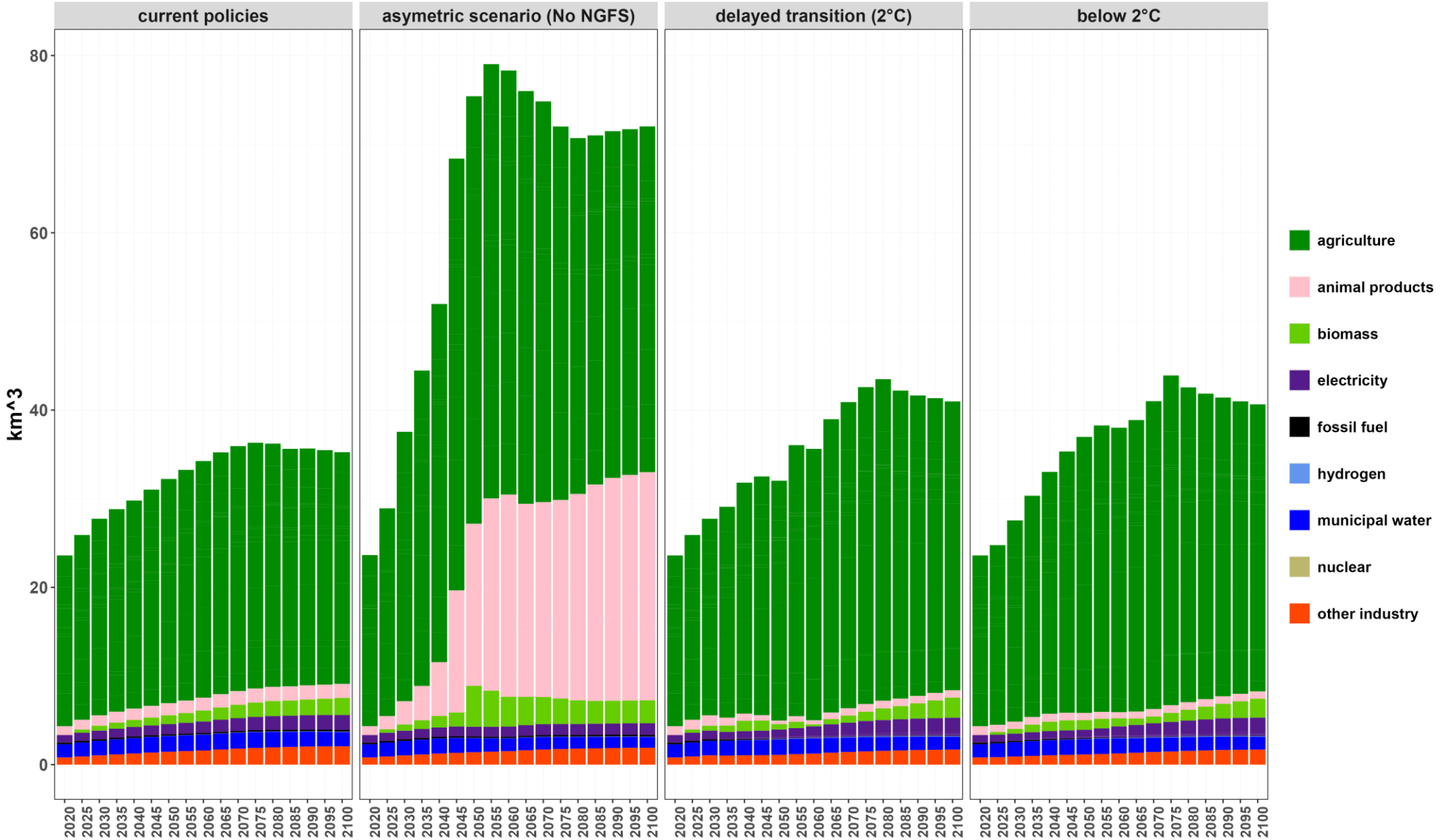
Water consumption

- Water use that permanently withdraws water from its source; water that is no longer available because it has evaporated, been transpired by plants, incorporated into products or crops, consumed by people or livestock, or otherwise removed from the immediate water environment (Vickers 2001).

Water Demand, Mexico



Water Consumption by sector



Climrisk

Present value of economic losses as % current GDP

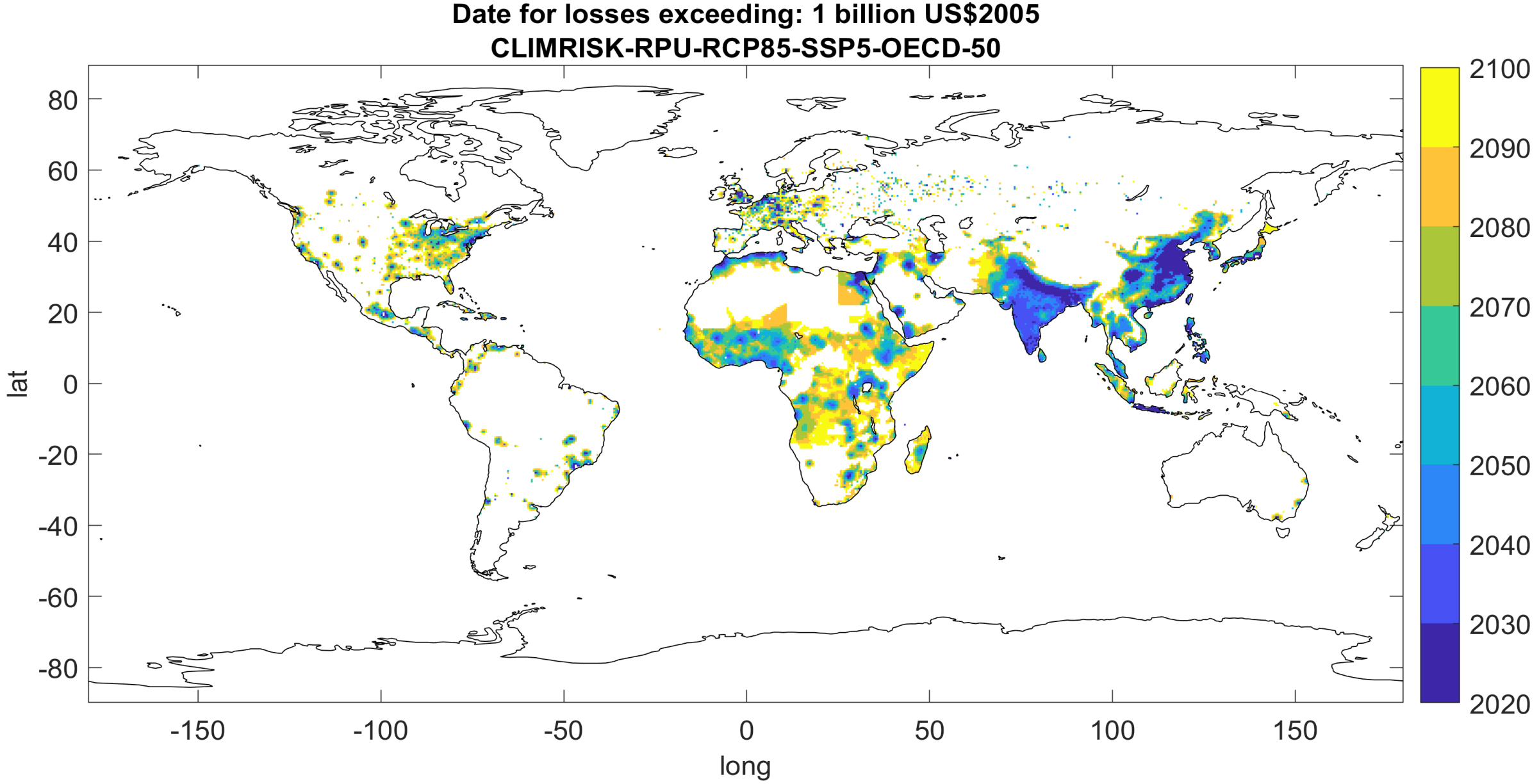
World, NGFS current policies

World region	Damage functions (RU) Config. B	Damage functions (RPU) Config. B
US	157.83% (103.29%, 256.84%)	377.2% (247.11%, 613%)
EU	203.38% (125.59%, 325.57%)	393.82% (243.38%, 629.81%)
Japan	149.91% (100.82%, 232.46%)	359.73% (242.21%, 557.07%)
Russia	211.94% (131.24%, 353.69%)	937.82% (582.41%, 1559.66%)
Eurasia	222.13% (140.24%, 376.97%)	685.71% (433.63%, 1161.28%)
China	260.58% (164.99%, 414.1%)	1166.27% (740.2%, 1848.02%)
India	819.07% (551.9%, 1244.86%)	3545.47% (2395.92%, 5369.73%)
MEAST	457.26% (308.38%, 734.73%)	1995.18% (1349.63%, 3193.6%)
Africa	1133.95% (739.09%, 1807.39%)	7785.96% (5110.57%, 12319.82%)
LAM	271.3% (182.96%, 431.04%)	728.57% (492.17%, 1155.1%)
OHI	201.22% (131.01%, 322.59%)	479.96% (312.83%, 768.45%)
OASIA	534.03% (362.86%, 819.51%)	2298.89% (1567.26%, 3514.27%)
MX	265.69% (187.62%, 417.37%)	713.02% (504.36%, 1117.62%)

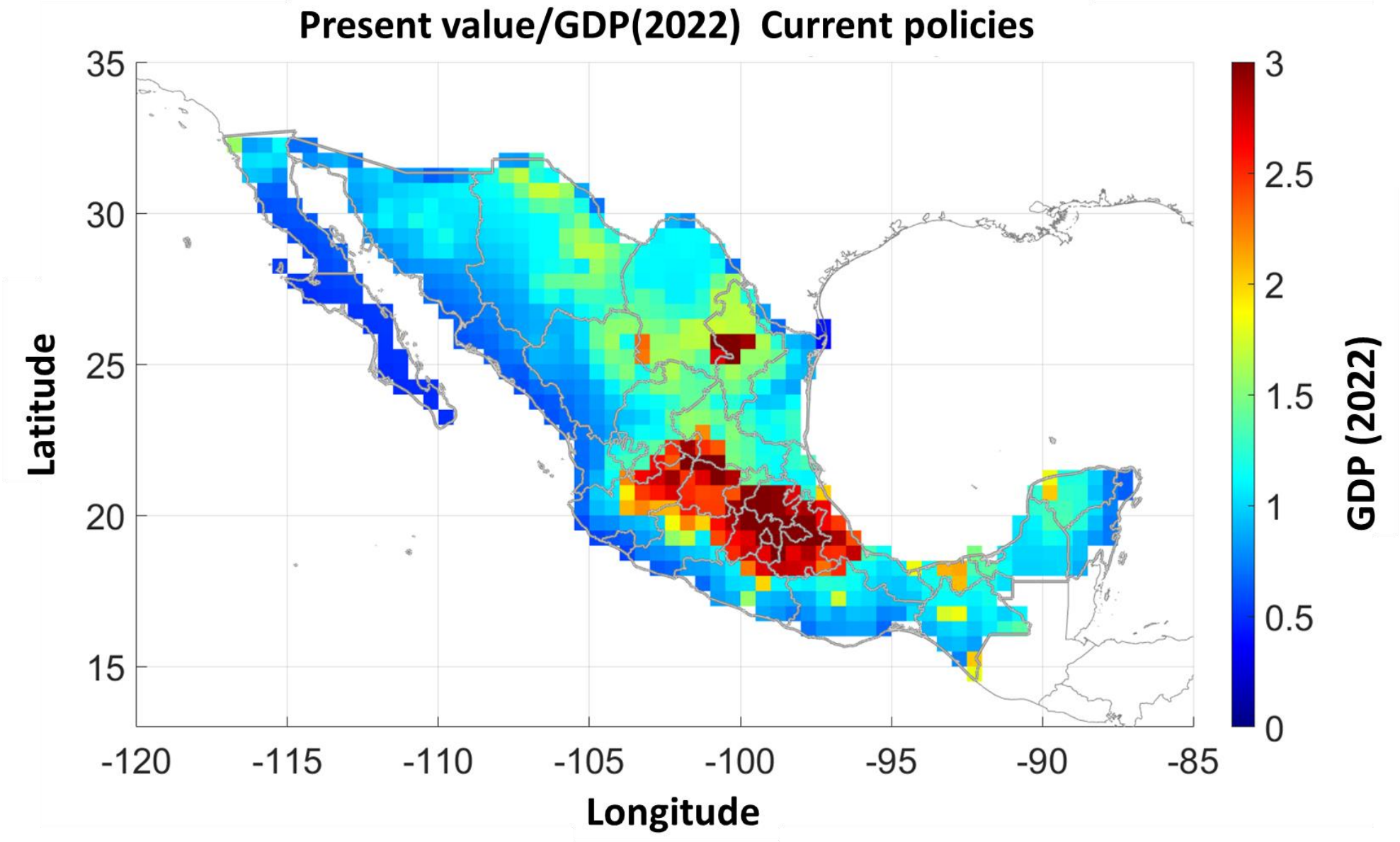
Mexico, NGFS Current policies; Below 2ºC

Exploring different configurations of damage functions

Current policies	Damage functions (RU)	Damage functions (RPU)
Config. A	241.08% (178.52%, 361.58%)	647.07% (480.03%, 968.29%)
Config. B	265.69% (187.62%, 417.37%)	713.02% (504.36%, 1117.62%)
Config. C	339.99% (210.26%, 712.9%)	914.7% (565.91%, 1917.9%)
Below 2ºC	**Damage functions (RU)**	**Damage functions (RPU)**
Config. A	179.13% (133.41%, 256.25%)	485.94% (362.35%, 694.09%)
Config. B	188% (132.22%, 282.08%)	509.32% (358.53%, 763.25%)
Config. C	201.46% (136.65%, 327.77%)	546.24% (370.65%, 888.51%)



Estrada F., Botzen W.J.W., 2021. Economic impacts and risks of climate change under failure and success of the Paris Agreement. Ann. N.Y. Acad. Sci. https://doi.org/10.1111/nyas.14652



Discount rate=1.5%; RU (Config. B)

Next steps

- The Scenario Analysis Pilot was launched on October 31st at the Climate Scenario Analysis Conference.
- Financial Institutions were invited to participate during the 1st quarter of 2024.
- 15 letters of interest were received and 10 institutions will be accepted (5 commercial banks, 2 development banks, 2 Afores and 1 insurance company).
- Execute the Bottom Up Pilot.
- Produce relevant reports.

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