**Economic Growth**

**Assume higher or lower growth in goods produced and services provided.** Economic Growth is measured in Gross Domestic Product (GDP) per person and is a key driver in energy consumption. Alternatives exist to meeting people’s needs through economic frameworks not based on constant GDP growth.

**Examples**

* Global efforts to reduce overconsumption and embrace voluntary simplicity.
* Possible impacts on economic growth from the effects of climate change.

**Big Message**

* Slower economic growth would be a high leverage approach for avoiding future temperature increases, however, there are lots of questions about how this might occur and be done in a way that is equitable.

**Key Dynamics**

* Population gets multiplied with GDP per capita to equal total global GDP, or Gross World Product. Increases in this variable accelerate the exponential growth of GDP, arguably the most important driver of future carbon dioxide emissions.
* Watch all the sources of energy change as you change economic growth.
* As you increase the economic damage caused by climate change, notice how this reduces the emissions, but cannot halt the temperature increase even under extreme assumptions where the worlds’ GDP plummets.

**Potential Co-Benefits of Lower Growth**

* Focus may be shifted to alternative measures of prosperity that enhance people’s wellbeing, such as gross national happiness.
* Greater focus on resource conservation and less on material consumption can lead to less waste.

**Equity Considerations**

* Economic growth is tied to pulling people out of poverty worldwide. Although, in recent decades, many gains in economic growth have gone to the world’s wealthiest. Regardless, policies must be tailored to specific local and regional circumstances.
* When GDP growth slows or contracts, governments can incur higher budget deficits, often implementing austerity measures—cutting spending and raising taxes—to offset the difference. These reforms can severely impact the poor and working class causing job losses and all the inequities that come with loss of livelihood. [[1]](https://docs.climateinteractive.org/projects/en-roads/en/latest/guide/econ_growth.html#econgrowthfn1)

**Slider Settings**

## Economic growth



|  |  |  |  |
| --- | --- | --- | --- |
|  | **low growth** | **status quo** | **high growth** |
| **Long-term economic growth** | 0.5% to 1.1% | 1.2% to 1.8% | 1.9% to 2.5% |
| **Near-term economic growth** | 1.7% to 2.1% | 2.2% to 2.9% | 3.0% to 3.7% |

## Impact of climate change

Climate change is expected to have multiple adverse effects on the economy, such as decreased investment in goods and services due to the cost of responding to changes in extreme weather events, sea level rise, desertification, crop yield decreases, flooding, and resulting migration. Several economists formulated this impact as a percentage reduction on global GDP, and estimated itas a function of temperature change. The four main functions in the literature are from [Nordhaus (2017)](https://www.pnas.org/content/114/7/1518.short), [Weitzman (2012)](https://scholar.harvard.edu/files/weitzman/files/ghgtargetsinsuranceagainst.pdf), [Dietz & Stern (2015)](https://onlinelibrary.wiley.com/doi/full/10.1111/ecoj.12188) and [Burke et al (2015)](https://www.nature.com/articles/nature15725). You can see their estimates for economic damage in the **Reduction in GDP vs Temperature** graph, and replicate them by entering the following values for the two sliders.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Nordhaus** | **Weitzman** | **Dietz & Stern** | **Burke** |
| **Reduction in GDP at 2 C** | 0.9 % | 1.3 % | 2.6 % | 13 % |
| **Maximum reduction in GDP** | 22 % | 97 % | 98 % | 20 % |

**Model Structure**

In the real world, there would be feedbacks to economic growth from energy prices, and various taxes, , the model does not include these effects. The user could explore such feedbacks by changing this input manually.

Following the formulation of damage functions in the academic literature, we specify the percentage reduction in GDP as a monotonically increasing function of global temperature increase. The two sliders ‘Reduction in GDP at 2 °C’ and ‘Maximum reduction in GDP’ enable the users to explore the strength of the feedback between climate impacts and economic growth. These two sliders are displayed on a single line since they are related to each other. *Maximum reduction in GDP* cannot be smaller than *Reduction in GDP at 2 °C,* hence they move together if a user tries to move them pass each other.

Please visit [support.climateinteractive.org](https://support.climateinteractive.org/) for additional inquires and support.

**Footnotes**

|  |  |
| --- | --- |
| [[1]](https://docs.climateinteractive.org/projects/en-roads/en/latest/guide/econ_growth.html#id1) | Ruckert, A., & Labonté, R. (2017). Health inequities in the age of austerity: The need for social protection policies. *Social Science & Medicine, 187*, 306–311. <https://doi.org/10.1016/j.socscimed.2017.03.029> |