

User guide: Access to NGFS scenario data

Data & Resources



Overview: Data and Navigation Tools	3
NGFS IIASA Scenario Explorer	9
NGFS Climate Impact Explorer	17
NGFS Data Engagement and Transparency (EnTry) Tool	20
IMF Climate Dashboard	26
Additional Resources and Tools	30



Overview: Data and Navigation Tools



Overview: Modelling and scope

The NGFS scenarios provide a range of data on climate-related transition risk, physical risk and economic impacts. This is produced by a suite of models aligned in a coherent way.

- Transition variables are separately produced by the three Integrated Assessment Models (IAMs): GCAM, MESSAGE and REMIND. These flow into the economic modelling.
- Climate and physical risk variables are produced by separate modelling. They provide chronic and acute physical risk indicators, that likewise flow into the economic modelling.
- Macro-financial variables are produced by the econometric model NiGEM, based on respective IAM and physical risk inputs.





Overview: Model outputs

NGFS scenarios have several key model outputs that are distributed across several dimensions.

- Models: The data is the output of three IAMs, the econometric model NiGEM based on IAM inputs and separate modelling for physical acute risks. As mentioned, each provides different variable categories.
- Time: Scenario data from IAMs is available in 5-year time steps until 2100. NiGEM provides yearly data until 2050.
- **Regions:** Available regional granularity differs by model and variable. They reach from world over regional aggregates to country-level.
- Variables: Variables can be separated in three categories, covering physical and transition risk and macro-financial impacts. Their availability differs by model as well as regional and sectoral granularity.





For an overview, we recommend using the Documentation in the <u>NGFS IIASA scenario explorer</u> as well as the <u>EnTry Parameter</u> <u>Guide</u> to identify available dimensions and parameters as well as combinations thereof.

Overview: Phase IV data dimensions

documentation tab. parameters.

other

and

Scenario Explorer ils, variables and

Navigating and querying NGFS Scenario Data requires an understanding of data availability across combinations of parameters. The below abstraction shows the dimensions of models, regions and scenarios per variable category.



Overview: Data access and navigation methods

NGFS climate scenario data is published on two native platforms. There are several ways to access the data, based on users' analytical processing needs.

There are three main access methods to NGFS climate scenario data:

- Workspaces: Both native data explorers, <u>NGFS IIASA Scenario</u> <u>Explorer</u> and <u>Climate Impact Explorer</u>, provide online interfaces to visualise and explore the data. Users can explore and compare variables over scenario, region and model.
- <u>Downloads</u>: The full data can be downloaded in bulk or filtered as .csv or .xlsx data frames from <u>NGFS IIASA Scenario Explorer</u> or <u>Climate Impact Explorer</u>.
- <u>Code-based access</u>: Both data explorers provide APIs to access the data in coding scripts directly. To facilitate users' access to this method, we provide the <u>NGFS EnTry Tool</u> (see slide 22).
- Additionally, the <u>IMF Climate Dashboard</u> offers a user-friendly exploration tool for key NGFS scenario data variables and respective visualization.





Overview: The NGFS scenarios portal

The <u>NGFS scenarios portal</u> acts as the starting point to all data portals and tools. Under Data & Resources, find access to the two native data explorers and additional official tools.



The NGFS portal is the point of entry for all new users to a first introduction and exploration of scenario data. It includes access to all data explorers and tools, the two native databases as well as the IMF Climate Dashboard and NGFS Data EnTry toolkit within the User Guide on Data Access.

- The <u>NGFS IIASA Scenario Explorer</u> provides intuitive visualisations and display of the transition scenarios time series data. This database also includes macro-economic data from NiGEM as well as data on acute physical risk impacts.
- The NGFS Climate Impact Explorer provides intuitive visualisations and display of the physical scenarios time series data, not limited to input used for the NGFS scenarios.
- The NGFS Data Engagement and Transparency (EnTry) toolkit (see slide 22) is a new data handling tool that supports users from data extraction to visualization with several pre-defined template scripts within one platform.
- The **IMF Climate Dashboard** shows key scenario variables in an intuitive user interface and acts as a first point of contact with NGFS scenario data.



NGFS IIASA Scenario Explorer



Access to the NGFS IIASA portal

The IIASA scenario explorer can be accessed from the NGFS scenarios portal. An account is optional, but provides options to save workspaces.

		WelCone! to the User and Service Management Appl	welcone! to the User and Service Management Application of the IIASA Energy, Climate and Environment Program. This management services		
NGES IIASA Scenario Explorer		the central place to manage user accounts a account.	end configurations for our web applications. To proceed please log in or register a		
tors has scenario	Explorer	🔁 Login	Register		
is web-based user interface provides intuit ansition scenarios time series data. This d	ve visualisations and display of the atabase also includes macro-economic	Username or E-Mail Address	Username		
mpact of physical risks on GDP.	Theory woods (who only as well as cara on	Password	E-Moil Address		
enario data is available for download as a	lsx or csv files via the Transition Scenario		LOGIN Password		
, hoseo by hose Alternatively, the bood Sython package <u>pyam</u>	currie accesses via a historie or the open-	Forgot your password? <u>Breat 2</u>	Nust contain at least 8 characters. Confirm Password		
Explorer	Documentation		☐ I have read and agree to the privacy policy.		
Comparison with	2-DEDITION BOOM		Read privacy policy >		

How to gain access to the IIASA portal? To save workspaces, simply create a (free) account <u>here</u> to gain access to Phase IV scenario data or simply access as a guest. Data of previous phases can be found in separate instances also available in the IIASA portal.



Using the NGFS IIASA Portal (1)

The IIASA scenario explorer allows to choose scenarios and models alongside variables and regions and visualise them.

To facilitate first steps, the IIASA scenario explorer tutorial provides a very helpful step-by-step tour to query the data for the first time. Additionally, <u>video tutorials</u> are offered on using the IIASA scenario explorer.

The main functionalities for exploring and downloading the data will be listed in the next slides.

NGFS Phase 3 Scenario Expl	orer								
Welcome to the NGFS Phase 3 Scenario Explorer You have no workspaces yet! Try to start from creating new one									
Create new workspace Import	Showing all workspaces 🕶	Ordered by name -	Enter to filter	×					
The scenario explorer uses workspace to group panels by topics. Create a new workspace to start exploring, or select an existing workspace below. You can also save and share workspaces with other users.	o the selected filters								



Using the NGFS IIASA Portal (2)

With "Create new workspace" you can create a clean workspace to select your variables, regions and scenarios.

The lower part of the page shows public analyses/queries that you can use if applicable to your needs.





1.a GCAM5.3+ NGFS: Energy demand and CO2 e...[@]

The NGFS scenarios explore a range of emission pathways and corresponding global warming trajectories (as compared to pre-industrial levels). Across all scenarios energy use is de-linked from its historical correlation with growth. Deep reductions in carbon intensity are further needed to reach net zero









Using the NGFS IIASA Portal (3)

twork for Greening the Financial Sv



Using the NGFS IIASA Portal (4)

a. After selecting the parameters of interest, click "apply" to produce a chart based on the queried data.

b. The data can be downloaded in various formats by using the download button above the chart.





Using the NGFS IIASA Portal (5)

The IIASA Scenario Explorer allows to download files containing full NGFS scenario data.

Bulk downloads can be found under the *Downloads* tab. Downloaded time series data will be in IAMC-format, containing model, scenario, region, variable, unit and years as columns in .csv format.





Using the NGFS IIASA Portal (6)

The receive an overview of all NGFS scenario parameters available in the IIASA Scenario Explorer refer to the portal's documentation.

To allow a better overview of available parameters (models, scenarios, etc.), a list of all parameters including more details about them can be found in the *Documentation* tab.

Slide 6 provides an overview of the different possible combinations.





NGFS Climate Impact Explorer



The Climate Impact Explorer

The Climate Impact Explorer provides access to climate-related data for physical risk estimation and temperature alignment consistent with NGFS Scenarios temperature pathways.

The explorer provides visualisations in form of graphs and maps, for a range of regions and variables describing the severity of a broad range of physical climate impacts.



Use of the Climate Impact Explorer

The Climate Impact Explorer is based on a simple and intuitive user interface that lets users choose a region, variable and scenario.

Explore how climate impacts will play out over time at current emissions reductions levels (according to the scenario used by the Network for Greening the Financial System) and in other Choose countries, indicators policy relevant scenarios, and how they will affect different areas of the selected country or province at different levels of warming and scenarios. Select a country, indicator and a COUNTRY PROVINCE INDICATOR SCENARIO scenario to view projections Mean Air Temperature NGFS current policies Antarctica Select a province Temporal average Annual -Spatial aggregation method Area-weighted average -Absolute change in mean air temperature in Germany This graph shows how absolute changes in Mean Air Temperature (expressed in degrees Celsius) will play out over time in Germany at different global warming levels compared to the reference period 1986-2006, based on the NGFS current policies scenario. + Compare to alternative scen 6.0 Mean Air Temperature in °C NGFS current policies Forecast and confidence intervals can be downloaded and compared 2.0° across scenarios. Baseline 9,14°C 2100 (reference period 1986-2006) 0.0 📕 5-95% confidence interval 🛛 Indicative model results after 2060 - Read more about the limitations of the analysis Source: ISIMIP

Climate impacts

NGFS Data Engagement and Transparency (EnTry) Tool



NGFS Data EnTry Tool

The NGFS Data Engagement and Transparency (EnTry) Tool is a new code-based data handling toolkit that supports users from data extraction to visualization within one platform.





NGFS Data EnTry Tool

The NGFS Data EnTry Tool allows users to build their own scripts to analyse the scenario data starting from pre-defined templates. The tool includes several scripts with examples to showcase its features and easy ways to attain and present the data of interest.

Current Scripts

Demo of all basic functionalities
 → Gives a tour through the functionalities of the tool.

Quick Query Tool & Parameter Guide

 \rightarrow Provides an easy ad hoc way to query and download data across models, scenarios and phases, as well as plot in NGFS style.

Quick Map Tool

 \rightarrow Provides an easy ad hoc way to produce maps based on available country-level data across models, scenarios and phases.

<u>Report Template</u>

ightarrow Template to create NGFS-themed reports with plots and descriptions.



The NGFS Data EnTry Tool is available on the NGFS scenario portal under <u>Data & Resources</u>. Additional scripts are provided within publication documents to provide full transparency of the presented visuals and the underlying data.

First steps with EnTry (1)

The provided scripts are intended as templates to be configured by users depending on their needs. To facilitate first steps and to run the provided scripts, follow the subsequent step-by-step guidance.

- **1.** Open one of the scripts in your browser and log in to your Google account. (You will be only able to run (not view) the scripts if logged-in)
- **2.** As the script is view-only, set the correct mode to make changes to the script. Either:
 - a) Continue in the default 'playground mode' to amend and execute the code as well as exporting outputs <u>without saving changes</u>. This mode is set by default when opening the view-only scripts.
 - b) If changes shall be saved, save a copy of the entire script or create a new empty notebook and copy only the desired lines of code.







First steps with EnTry (2)

3. To set-up the connection, run the initialization cells of the respective script.

- **4.** Start querying, plotting and analyzing. E.g.
 - The <u>EnTry Demo Script</u> will take you through the basic functionalities.
 - The <u>Quick Query tool</u> provides an interface to query data without coding, but can be extended as preferred.



• Detailed instructions including support functions can be found directly in the scripts.



 For the selection of variables, we recommend using the Documentation in the <u>NGFS IIASA scenario explorer</u> as well as the <u>EnTry Parameter Guide</u> to identify parameter names and possible combinations.

EnTry Support Functions

The NGFS Data EnTry Tool leverages on the functionality provided by the IIASA open-source python package Pyam. It provides several user support functions.

In case of questions regarding the functionalities of the **Pyam package**, please refer to the following platforms.

- Pyam Documentation
 → Technical documentation on functions and features included in the pyam package
- Slack
 → Slack channel discussing issues with the package
- GitHub
 → Developer supported GitHub forum on issues with the package

For feedback on the NGFS EnTry scripts and their application, please participate in our standing user survey.



IMF Climate Dashboard



IMF Climate Dashboard

Within the IMF's Climate Dashboard, a dedicated NGFS <u>dashboard</u> provides a first overview of NGFS scenario outputs. It allows users to easily select, visualize and compare key indicators.





IMF Climate Dashboard: First steps

The NGFS indicator section runs you through the principal energy transition and climate indicators along some explanatory descriptions – all on one webpage.

The discussed indicators include

- Emissions
- Carbon prices
- Energy use
- Temperature pathways
- GDP impacts

and more.

NGFS Indicators

This page presents a selection and visualization of key indicators from the integrated assessment models used in the Network for Greening the Financial System (NGFS) climate scenarios. It is curated by the IMF in collaboration with the NGFS. The full data set can be found at the original sources.

Sources: NGFS (2023), Scenarios Portal; and IIASA (2023), NGFS Phase 4 Scenario Explorer.





IMF Climate Dashboard: First steps

The IMF Climate Dashboard lets you explore and compare NGFS scenario data, but also export the selected time series data.

1. Per indicator, start by selecting the region as well as scenarios to be compared.

2. As a result, the dashboard will return a matrix of plots displaying the indicator for selected scenarios by all three input IAM.

3. The portal offers an option to view the time series data online. Alternatively, there's the option for downloading the queried data.

Primary Energy Mix

Given its high CO₂ emissions relative to other fossil fuel alternatives, the share of coal is rapidly phased out in the energy mix from 29 percent in 2020 to 11 percent in 2030 and close to 0 percent in 2050. By 2050, renewables and biomass would deliver 65 percent of global primary energy needs in the Net Zero 2050 scenario. This is a marked contrast to the Current Policies scenario where fossil fuels continue to be the dominant source of primary energy, even after accounting for current technology trends.







Additional Resources



Additional Resources – Questions

Any questions about the NGFS scenarios?

- You can check out our FAQ page
- If your questions are not answered, you can submit them to our <u>NGFS Q&A portal</u> and we will do our best to answer them.

NGFS Scenarios Q&A Last name* Please enter your last name First name* Please enter your first name Institution* Please enter the name of your institution Email* Please enter your email Ouestion* Please enter your question Attached image Choose File No file chosen UPLOAD Files must be less than 2 MB. Allowed file types: jpg jpeg png.

