

NPC GLOBAL OIL & GAS STUDY

TRENDALYZER QUICK START GUIDE

The following document outlines the main functionality of the Trendalyzer (beta) software developed by Gapminder Ltd (www.gapminder.org):

A) Trendalyzer Overview

Trendalyzer is a simple to use program which allows you to rapidly select and visualize bivariate data. The Trendalyzer software included with this file has been pre-loaded with projections of energy supply and demand data for selected geographic areas – the world, its major regions, and the United States. The projections in Trendalyzer are among those considered by the National Petroleum Council in its 2007 Global Oil and Gas Study titled “Facing the Hard Facts about Energy.”

Using Trendalyzer, it is possible to compare projections from a number of forecast studies including data from

- i) public sources, such as
 - the U.S. Energy Information Administration,
 - the International Energy Agency and
 - Wide-Net research of projections from academia, governmental organizations, non-governmental groups, and other interests, and
- ii) aggregated proprietary surveys of international oil companies and consulting companies
 - as reviewed and consolidated by a public accounting firm under rules provided by the NPC to protect the confidentiality of any individual information.

B) Other Documents Provided

The user’s first step is to install Trendalyzer (“NPC_Trends_installer.exe”). After setup, these instructions will guide operations. However, there is additional information, which will also help analysis – a list of the forecast cases gleaned from the various global and USA studies (see section F, Trendalyzer Case List) and notes about selected forecast data which warrant additional explanation (section G, Trendalyzer Data Notes).

C) Installation

- i) Download and unzip the installation package file.
- ii) The installation file is an executable file (NPC_Trends_installer.exe). To install the file, double-click on this file, and follow the instructions to install the software on your PC desktop. During the installation, you may be asked to provide the location of the “NPCStudyData.tlz” file. This file will be located in the same folder containing the Trendalyzer installer.
- iii) After installation is complete, start Trendalyzer by double clicking the red Trendalyzer icon which appears on your desktop.

D) Using Trendalyzer

After starting Trendalyzer, the application will prompt you to select one of three languages, then present the main screen shown in figure 1. The opening screen presents a

bivariate plot of oil production spanning the period 1985-2030 for eight geographic regions, as forecast in the EIA Reference case. A “case” corresponds to a particular forecast scenario, and is characterized by the assumptions underlying the forecast. The EIA Reference case alone is divided into components which allow comparison of forecast data for different countries, geographic regions, or continents. All other cases provide forecasts for either the entire world or the USA.

Positioning the cursor over a data point highlights the point, shows the year at that point, then fades all lines other than the one associated with the highlighted point. Clicking a point labels it with the year until the point is clicked again. Note that solid circles on trend lines identify values present in the data; half-filled circles identify interpolated data points.

Trendalyzer supports comparison of trend lines each representing a separate case or, as is presented in figure 1, within an individual case. As noted above, only the EIA Reference case has data which allows comparison of trend lines within the case. Figure 1 presents data allowing a comparison of oil production in different geographic regions, as forecast in the EIA Reference case. Comparison of trend lines involving separate cases is only available for forecast data representing the entire world and the USA.



Figure 1 – Trendalyzer application interface

Using Trendalyzer, you can explore the data by changing which data are displayed, and how they are displayed. Figure 2 presents a Trendalyzer interface with selected display controls highlighted by red boxes, each of which is numbered:

Controls for data selection:

- 1) **X-axis**: Allows selection of the X-axis variable using cascading menus.
- 2) **Y-axis**: Allows selection of a Y-axis variable using cascading menus.
- 3) **Symbol Color**: Allows the displayed bubble color on each trend line to be changed so that it reflects variations in a variable of your choosing. This effectively enables visualization of a third variable.
- 4) **Symbol Size**: Allows the size of the displayed bubble on each trend line to vary with the magnitude of a variable of your choosing. This effectively enables visualization of a fourth variable.
- 5) **Unselected cases or case components** (identified as gray points) can be selected by clicking on them. Once selected, a trend line can be produced with the “Trails” button enabled. Cases or case components can be deselected by clicking on the first data point for it.
- 6) **Favorites**: Similar to favorites used to browse the internet, favorite graphs can be saved using this button. Thirty seven favorites have been saved to expedite exploration of the data provided in Trendalyzer.

Controls for data presentation:

- 7) **Scale**: Allows selection of different Y-axis types (linear, log, inverse log).
- 8) **Key**: Displays a list of all selected cases or case components. Positioning the cursor over an item in the key flashes the associated trend line.
- 9) **Trails**: Allows trend lines to be turned off or on. Once enabled, trend lines for selected cases or case components can be created (see “Time bar” below).
- 10) **Time bar**: With “Trails” disabled, the red button on the time bar selects the year to present. After initially enabling the “Trails” button, a trend line is produced by clicking the red time bar button, and dragging it to the right extent of the time bar. After trend lines are created, the red button selects the greatest year of a trend line to display.

Auxiliary controls:

- 11) **Export Images**: Allows the current image to be saved to a file (including exports to Microsoft PowerPoint format).



Figure 2 – Trendalyzer interface with display controls outlined and enumerated in red

E) Additional Comments

In addition to the functions listed above, Trendalyzer provides other capabilities for visualizing data. Controls in the lower left of the application, for example, can be used to enable animation of the display area.

Please note, however, that the Trendalyzer software provided here is an old (2003) beta version. Some of the more unusual functions contained in the application can produce unexpected results (or errors).

For more information about Trendalyzer, please go to www.gapminder.org. Of particular use may be a video tutorial, which is accessible via the “Help?” button on the “[Gapminder World, 2006](#)” web application. Also of interest is an example application of Trendalyzer presented by Dr. Hans Rosling, as captured in an educational and entertaining online [video](#).

F) Trendalyzer Case List

Cases as they appear within the Trendalyzer software

ARI- High Energy Prices -- US Department of Energy - Prepared by Advanced Resources International

ARI- Low Energy Prices -- US Department of Energy - Prepared by Advanced Resources International

ARI- Reference -- US Department of Energy - Prepared by Advanced Resources International

ASPO France- Reference -- Association For The Study Of Peak Oil - Jean Laherrere

CCSP- IGSM- Low Energy Supply And Demand -- U.S. Climate Change Science Program - IGSM (MIT Integrated Global System Model)

CCSP- IGSM- Reference -- U.S. Climate Change Science Program - IGSM (MIT Integrated Global System Model)

CCSP- MERGE- Low Energy Supply And Demand -- U.S. Climate Change Science Program – MERGE (Model for Evaluating the Regional and Global Effects)

CCSP- MERGE- Reference -- U.S. Climate Change Science Program – MERGE (Model for Evaluating the Regional and Global Effects)

CCSP- MinCam- Low Energy Supply And Demand -- U.S. Climate Change Science Program - MinCam (Mini Climate Assessment Model)

CCSP- MinCam- Reference -- U.S. Climate Change Science Program - MinCam (Mini Climate Assessment Model)

Consultants (Avg)- All Case Types -- Aggregated average of data from consultants, considering all projections

Consultants (Hi)- All Case Types -- Aggregated average of data from consultants, considering only highest projections

Consultants (Lo)- All Case Types -- Aggregated average of data from consultants, considering only lowest projections

EC-WETO- Alternative Energy Policy -- European Commission -World Energy Technology Outlook 2050 (WETO-H2)

EC-WETO- Business As Usual Energy Policy -- European Commission -World Energy Technology Outlook 2050 (WETO-H2)

EC-WETO- Low C02 Emissions -- European Commission -World Energy Technology Outlook 2050 (WETO-H2)

EIA- High Energy Prices -- Energy Information Administration (EIA)

EIA- High Energy Supply and Demand -- Energy Information Administration (EIA)

EIA- Low Energy Prices -- Energy Information Administration (EIA)

EIA- Low Energy Supply and Demand -- Energy Information Administration (EIA)

EIA- Reference -- Energy Information Administration (EIA)

EIA- Reference - Historical -- Energy Information Administration (EIA)

EnergyFiles- Business As Usual Energy Policy -- Micheal R Smith/EnergyFiles

EPA / ANL- Alternative Energy Policy -- EPA and the Argonne National Laboratory

EPA / ANL- Alternative Energy Policy -- EPA and the Argonne National Laboratory

EPA / ANL- Reference -- EPA and the Argonne National Laboratory

Greenpeace- Low C02 Emissions -- Greenpeace & European Renewable Energy Council

Greenpeace- Reference -- Greenpeace & European Renewable Energy Council

IEA- Alternative Energy Policy -- International Energy Agency (www.iea.org)

IEA- Beyond Alternative Energy Policy -- International Energy Agency (www.iea.org)

IEA- Low Total Upstream And Downstream Investments -- International Energy Agency (www.iea.org)

IEA- Reference -- International Energy Agency (www.iea.org)

IOC (Avg)- All Case Types -- Aggregated average of data from international oil companies considering all projections

IOC (Hi)- All Case Types -- Aggregated average of data from international oil companies considering only highest projections

IOC (Lo)- All Case Types -- Aggregated average of data from international oil companies considering only lowest projections

MIT- Low C02 Emissions with Extra Nuclear- Low C02 Emissions -- Massachusetts Institute of Technology

MIT- Low C02 Emissions with Limited Nuclear- Low C02 Emissions --
Massachusetts Institute of Technology

MIT- Reference -- Massachusetts Institute of Technology

NAS- Alternative Energy Policy -Scenario 2: Hybrid vehicles replace conventional, no hydrogen -- National Academy of Sciences - Committee on alternatives and Strategies for Future Hydrogen Production and Use, National Research Council

NAS- Alternative Energy Policy -Scenario 3: All conventional vehicles, no hybrid or hydrogen -- National Academy of Sciences - Committee on alternatives and Strategies for Future Hydrogen Production and Use, National Research Council

NAS- Alternative Energy Policy -Scenario 4: Hybrid replace conventional, both replaced by hydrogen, hydrogen produced from natural gas -- National Academy of Sciences - Committee on alternatives and Strategies for Future Hydrogen Production and Use, National Research Council

NAS- Alternative Energy Policy -Scenario 5: Hybrid replace conventional, both replaced by hydrogen, hydrogen produced from coal -- National Academy of Sciences - Committee on alternatives and Strategies for Future Hydrogen Production and Use, National Research Council

Oak Ridge NL - Campbell- Reference -- Oak Ridge National Laboratory

Oak Ridge NL - IASA/WEC- Low Energy Supply And Demand -- Oak Ridge National Laboratory

Oak Ridge NL - IASA/WEC- Reference -- Oak Ridge National Laboratory

Oak Ridge NL - Rogner- Reference -- Oak Ridge National Laboratory

Oak Ridge NL - USGS- High Energy Supply and Demand -- Oak Ridge National Laboratory

Oak Ridge NL - USGS- Reference -- Oak Ridge National Laboratory

Oak Ridge NL - USGS2000- Low Energy Supply And Demand -- Oak Ridge National Laboratory

ODAC- Reference -- Oil Depletion Analysis Centre

OPEC- Business As Usual Energy Policy -- Organization of the Petroleum Exporting Countries (OPEC)

OPEC- High Energy Prices -- Organization of the Petroleum Exporting Countries (OPEC)

OPEC- Low Energy Supply And Demand -- Organization of the Petroleum Exporting Countries (OPEC)

PONL- High Energy Supply and Demand -- Peak Oil Netherlands Foundation

PONL- Low Energy Supply And Demand -- Peak Oil Netherlands Foundation

PONL- Reference -- Peak Oil Netherlands Foundation

Prop (Avg Hi)- All Case Types -- Aggregated average of data from all proprietary sources considering only highest projections

Prop (Avg Lo)- All Case Types -- Aggregated average of data from all proprietary sources considering only lowest projections

Prop (Avg)- All Case Types -- Aggregated average of data from all proprietary sources considering all projections

SAIC - Peak 0 years- Alternative Energy Policy - Peak 0 Years -- Science Applications International Corporation (SAIC)

SAIC - Peak 10 years- Alternative Energy Policy - Peak 10 Years -- Science Applications International Corporation (SAIC)

SAIC - Peak 20 years- Alternative Energy Policy - Peak 20 Years -- Science Applications International Corporation (SAIC)

SAIC- Reference- Reference -- Science Applications International Corporation (SAIC)

D) Trendalyzer Data Notes

The following notes provide additional information about the historical and forecast data presented by the Trendalyzer software:

Oil Production - Not all data sources use precisely the same definitions for oil production or have the same historical statistics. Thus, while the absolute numbers may differ, the trends indicate the direction of supply within the forecast.

Gas Production - Most sources providing forecast data define natural gas production to include dry natural gas but some may use wet gas. Wet gas would include hydrocarbons, which might be extracted by processing into liquids. Though the absolute numbers may differ in magnitude, the trends indicate the direction of supply within the forecast.

Coal Production - Some sources use different base year statistics, which may influence the content and level of the forecast. Though the absolute numbers may differ in magnitude, the trends indicate the direction of supply within the forecast.

Liquid Biofuels Production - The forecasts shown compare liquid biofuels (alcohols produced from biomass such as sugar cane and corn) rather than other biomass (wood, wastes and other biofuels).

EIA Oil Production – These values include crude oil, lease condensates, natural gas liquids and other liquids but do not include processing gains.