United Nations | Statistics Division

Module 14. Good and best practices for releasing the data

Workshop on the Strategic Framework for the African Bioenergy Data Management

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Lomé, Togo

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Outline

- Introduction
- Disseminations and data users
- UNSD solutions
- Charts - the basics of visualization
- Examples of charts
- Storytelling with charts
- Conclusion

Introduction

Dissemination policy

"The dissemination policy should be user oriented, reaching and serving all user groups (central government, public organizations and territorial authorities, research institutions and universities, private sector, media, general public, international users), and provide quality information."

United Nation (2012), *International recommendations for Energy Statistics*, 10.2

Role of official statistics agencies in dissemination

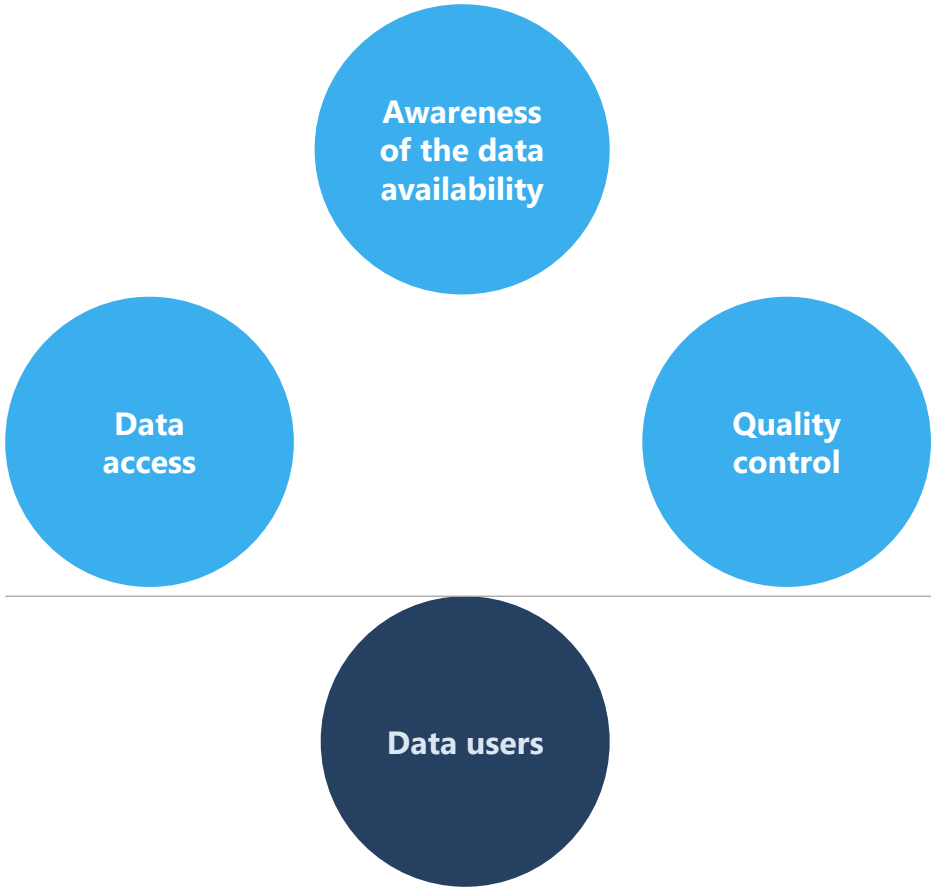
- Provide impartial information to government and citizens
- Present information according to scientific standards
- Are entitled to comment on erroneous interpretation and misuse of statistics

United Nations (2014), *Fundamental Principles of Official Statistics*, https://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx

Disseminations and data users

Data dissemination strategies

- Adopting a user-oriented dissemination policy:
  - Data awareness (existing datasets, release calendar, newly available datasets)
  - Data access (freely available, easy to find, user friendly access)
  - High quality data (quality control, clear methodology, units, definitions)
- Harmonization data with international standards and provide metadata.
- Providing contact point for data requests.
- Adapting format to take into account the diversity of users.



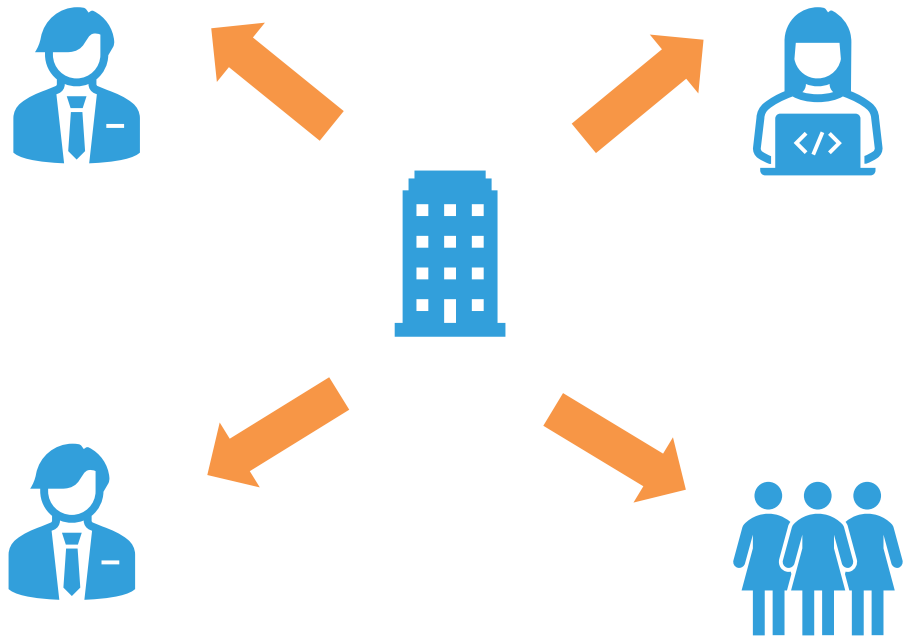
Users (or potential users) interest and technical expertise

Policy makers

- Interest: ?
- Technical knowledge: ?

Analyst, modelers, researchers

- Interest: ?
- Technical knowledge: ?



Programme, project managers

- Interest: ?
- Technical knowledge: ?

General audience, students, journalist

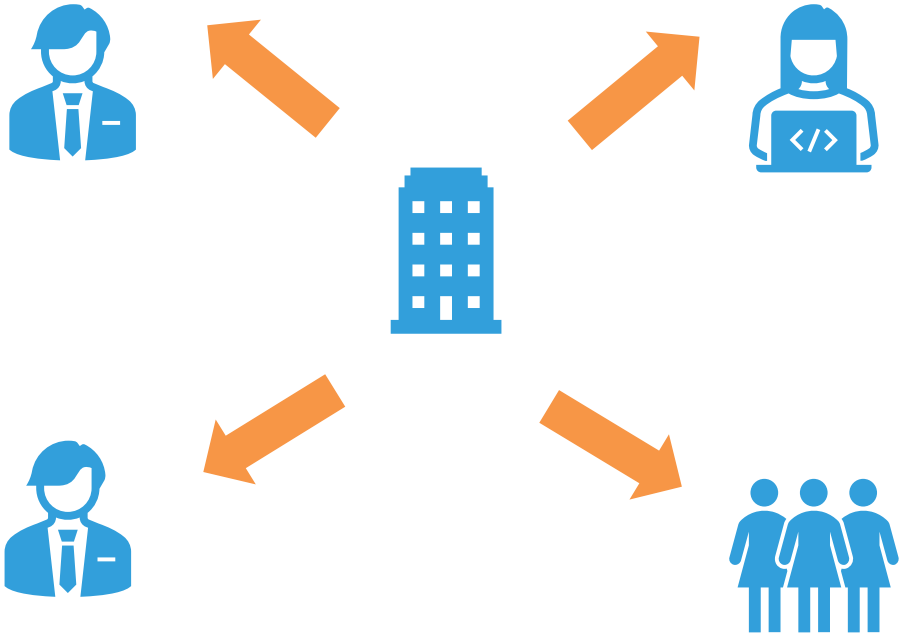
- Interest: ?
- Technical knowledge: ?

What are their interests and technical knowledge? What are their data needs?

Users interest and technical expertise

Policy makers

- Interest: inform their decisions based on findings
- Technical knowledge: Fundamental



Analyst, modelers, researchers

- Interest: replicate or continue project
- Technical knowledge: Expert

Programme, project managers

- Interest: monitor and evaluate projects
- Technical knowledge: Associate

General audience, students, journalist

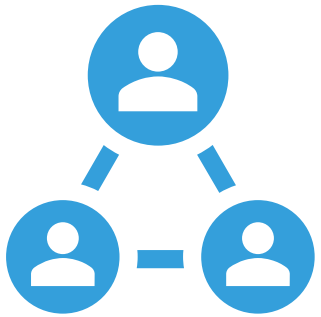
- Interest: to understand the general results and impacts
- Technical knowledge: Novice or generalist

Visualization tools and interactive charts help non-experts extract information from data.

Data users

"[…] Countries are encouraged to work closely with the user community by conducting vigorous outreach campaigns, including building stable and productive relationships with users and key stakeholders, for example, inviting interested users to become standing customers, actively helping users to find the statistical information they need and assisting them in the understanding of the role of energy statistics in sound decision making."

United Nation (2012), *International recommendations for Energy Statistics*, 10.3



UNSD solutions

UNSD outputs - before

Statistics database extract

Technical knowledge: Expert

- One line per one datapoint
- Codes to describe product, country, flow, unit
- Accompanied by file with codes explanation
- Requires data manipulation and transformation techniques

UN data portal

Technical knowledge: Associate

- Data sharing tool
- Allows users to browser to different combinations of flows for one products for many countries
- Not users friendly

Legacy publications

Technical knowledge: Associate

- Present some aggregates and charts
- Mostly data tables
- Statistics for last 4 years (with few exceptions)
- Balances for last 2 years, without regions or world

UNSD outputs – added outputs

Data portal

Technical knowledge: Novice or generalist, and others

-Balances by country from 1990
-Dashboards with key charts, sankey diagram, balances tables
-Allows user to download data behind

Dashboard

Technical knowledge: Novice or generalist

-Simple excel
-To complement data portal with data aggregated by subregion, region and world level

Pocketbook publication

Technical knowledge: Novice or generalist

-Presents data highlights in more visual way, including maps

API

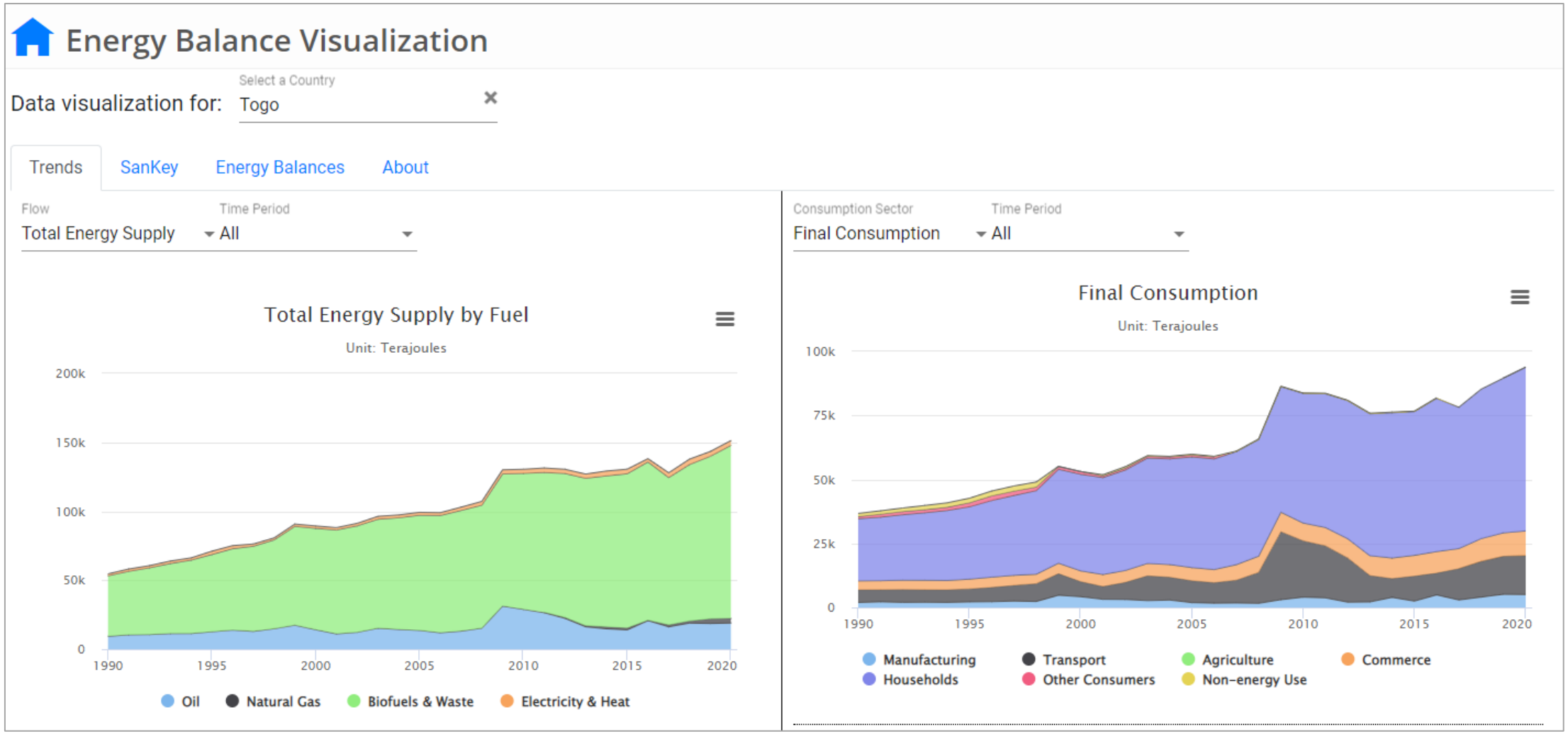
Technical knowledge: Expert

-For energy statistics and energy balances country
-Allows advance users to automatically grab the data from the website

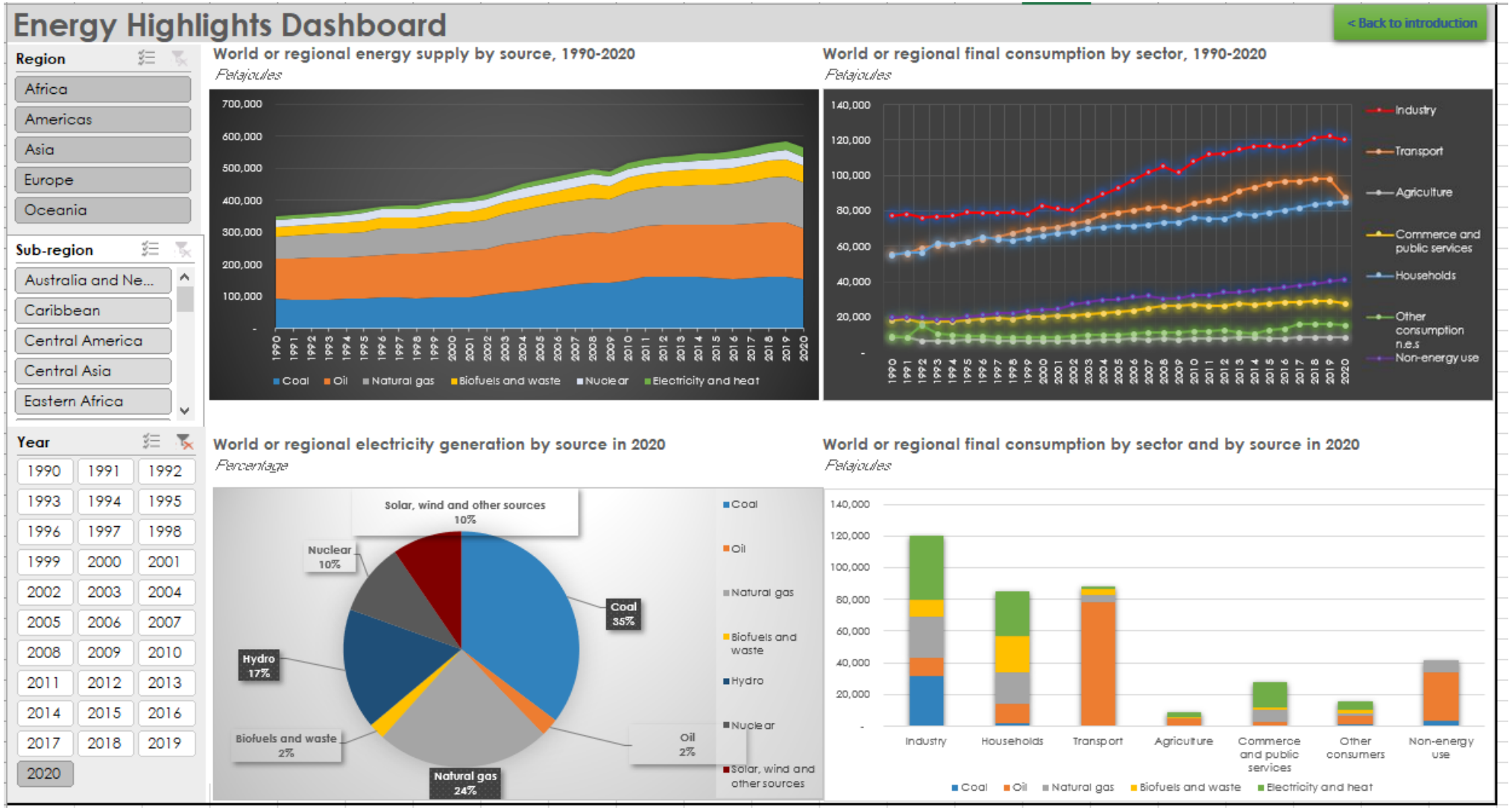
+ Data source file

All developed inhouse!

Data Portal


Energy Balance Visualization
Data visualization for:
Select a Country
Togo
Trends
SanKey
Energy Balances
About
Flow
Total Energy Supply
Time Period
All
Total Energy Supply by Fuel
Unit: Terajoules
200k
150k
100k
50k
0
1990
1995
2000
2005
2010
2015
2020
Oil
Natural Gas
Biofuels & Waste
Electricity & Heat
Consumption Sector
Final Consumption
Time Period
All
Final Consumption
Unit: Terajoules
100k
75k
50k
25k
0
1990
1995
2000
2005
2010
2015
2020
Manufacturing
Transport
Agriculture
Commerce
Households
Other Consumers
Non-energy Use

Dashboard

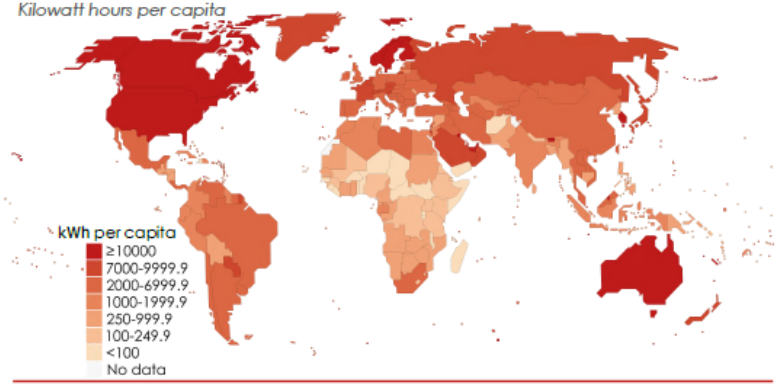

Energy Highlights Dashboard
< Back to introduction
Region
Africa
Americas
Asia
Europe
Oceania
Sub-region
Australia and Ne...
Caribbean
Central America
Central Asia
Eastern Africa
Year
1990 1991 1992
1993 1994 1995
1996 1997 1998
1999 2000 2001
2002 2003 2004
2005 2006 2007
2008 2009 2010
2011 2012 2013
2014 2015 2016
2017 2018 2019
2020
World or regional energy supply by source, 1990-2020
Petajoules
700,000
600,000
500,000
400,000
300,000
200,000
100,000
-
Coal
Oil
Natural gas
Biofuels and waste
Nuclear
Electricity and heat
World or regional final consumption by sector, 1990-2020
Petajoules
140,000
120,000
100,000
80,000
60,000
40,000
20,000
-
Industry
Transport
Agriculture
Commerce and public services
Households
Other consumption n.e.s
Non-energy use
World or regional electricity generation by source in 2020
Percentage
Solar, wind and other sources 10%
Nuclear 10%
Coal 35%
Hydro 17%
Biofuels and waste 2%
Oil 2%
Natural gas 24%
Coal
Oil
Natural gas
Biofuels and waste
Hydro
Nuclear
Solar, wind and other sources
World or regional final consumption by sector and by source in 2020
Petajoules
140,000
120,000
100,000
80,000
60,000
40,000
20,000
-
Industry
Households
Transport
Agriculture
Commerce and public services
Other consumers
Non-energy use
Coal
Oil
Natural gas
Biofuels and waste
Electricity and heat

Energy Statistics Pocketbook

Electricity

35. Electricity generation per capita, 2020

Kilowatt hours per capita



FACTS AND FIGURES

In 2020, total electricity generation was 26.8 PWh, slightly decreasing compared to 2019 (-0.6%); overall, electricity from renewable sources kept increasing in 2020 – for example, solar grew by 20.6% and wind by 11.9% - while electricity generated from thermal sources declined by 2.5% compared to 2019.

In the long run, electricity increased by 124.0% between 1990 and 2020; the largest absolute growth was observed for electricity generated from coal (5,022 TWh or +113.1%) and natural gas (4,619 TWh or +258.8%), while the fastest growth was visible for electricity generated from solar, wind and other sources[4] (+4,067% or 2,501 TWh).

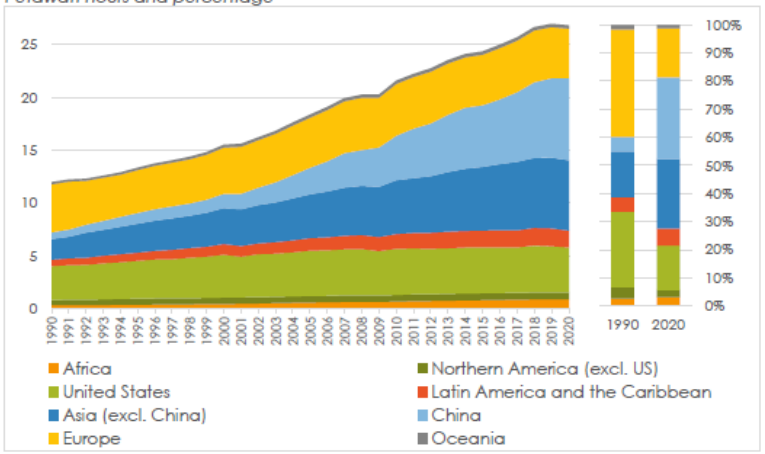
In 2020, 72.0% of all electricity was generated from non-renewable sources, mainly from non-renewable thermal (61.9% or 16,603 TWh) and nuclear sources (10.0% or 2,674 TWh). However, renewable electricity accounted for 61.7% of global electricity capacity additions over the last decade, growing to 2,929 GW in 2020 and reaching 37.7% of total electricity capacity.

(4) See notes on pages 68-73.

2023 Energy Statistics Pocketbook

36. Total electricity generation by region, 1990-2020

Petawatt hours and percentage



37. Total electricity generation by region, 1990, 2000, 2010 and 2020

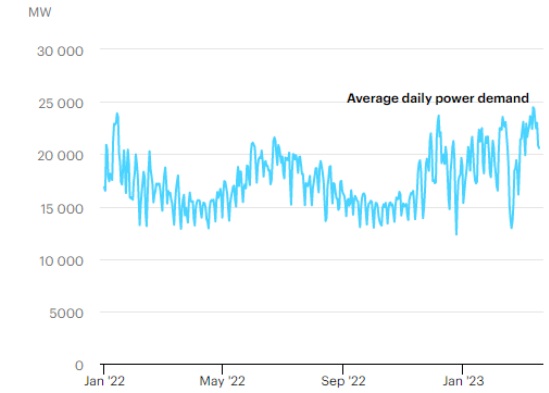
Terawatt hours

Region	1990	2000	2010	2020
Africa	311.6	437.3	677.6	848.0
Northern America (excl. US)	482.9	606.6	604.3	653.1
United States	3,218.6	4,052.7	4,378.4	4,260.0
Latin America and the Caribbean	624.6	1,010.6	1,405.5	1,610.0
Asia (excl. China)	1,947.5	3,396.2	5,091.1	6,652.9
China	621.2	1,355.6	4,207.2	7,779.1
Europe	4,571.5	4,386.8	4,913.7	4,690.7
Oceania	192.8	257.9	308.1	322.1
World	**11,970.7**	**15,503.8**	**21,585.9**	**26,815.9**

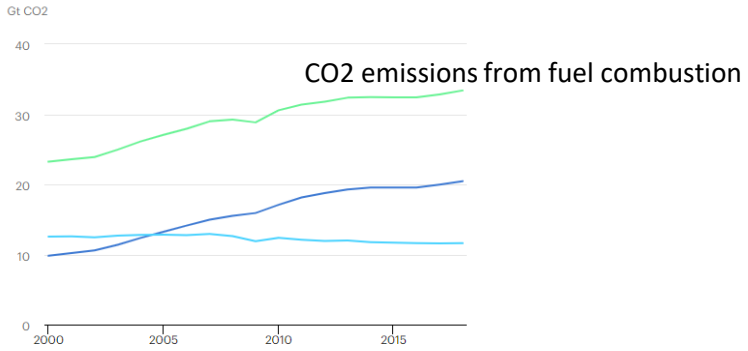
Charts - the basics of visualization

Trends

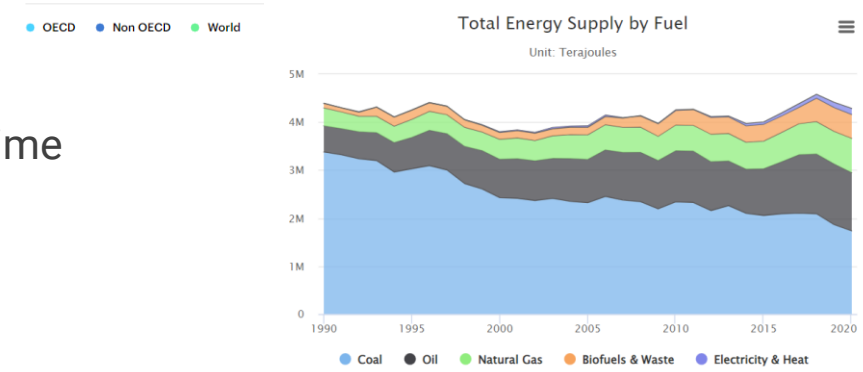
Simple line chart – presents how a numeric variable changes over time



Multi-line chart – compares multiple numeric variables over time



Stacked area chart – used to track breakdown of a numeric variable over time

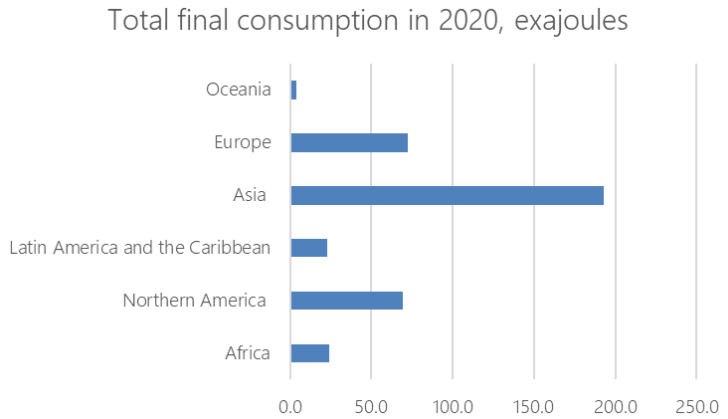


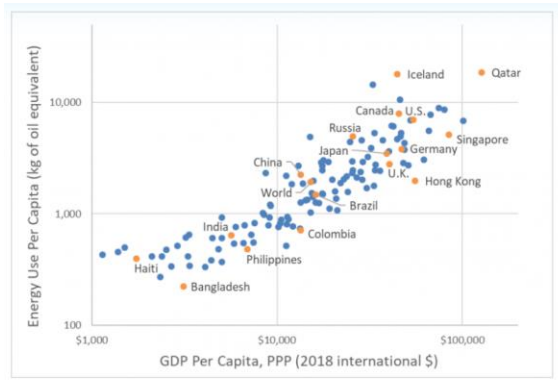
Relationships

Bar chart/Column chart – comparison of categorical data

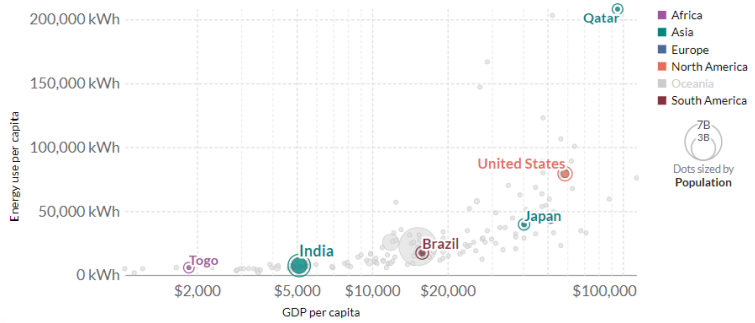
Scatter plot – shows a relationship between two variables

Bubble chart – used to visualize data points with 3 dimensions, with size of the babble



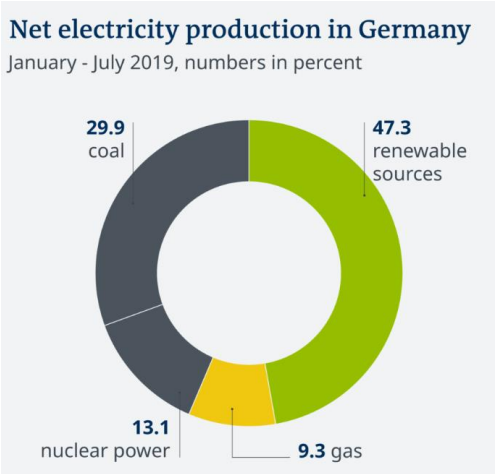


Energy use per capita vs. GDP per capita in 2014. Sources: International Energy Agency [5] and World Bank [6].

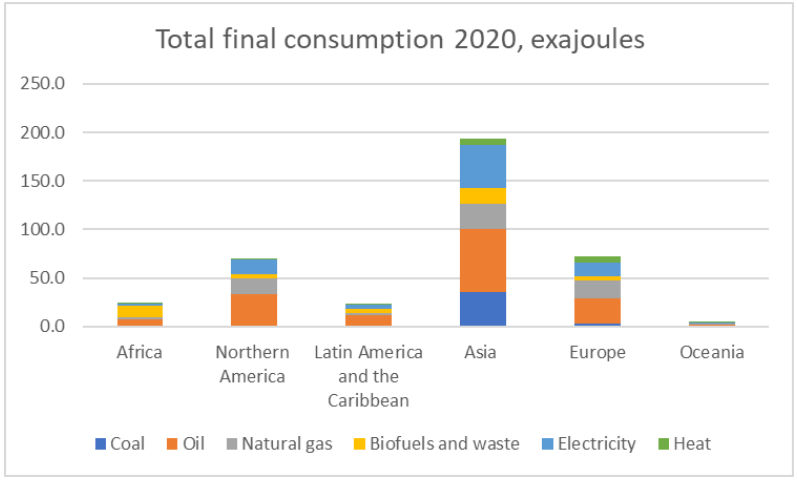


Part of a whole

Pie chart/donut pie chart – to show part of the whole data or percentages

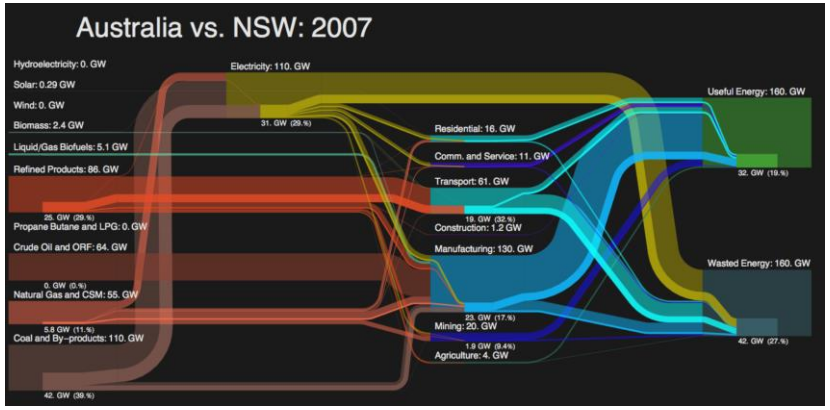


Stacked column chart – used to compare subcategories within categorical data

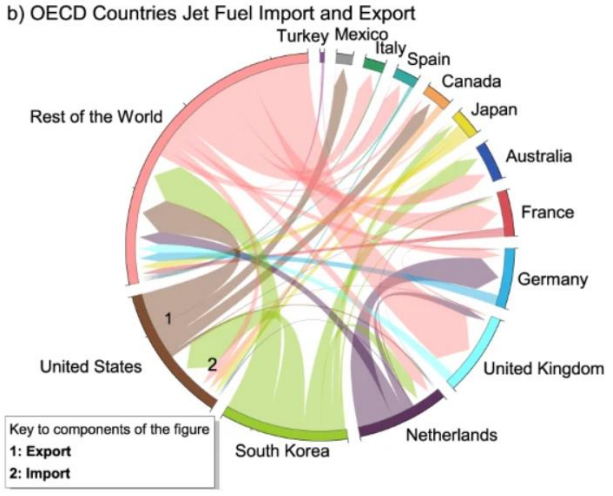


Flows

Sankey diagram – represents flow in the system



Dependency wheel (chord chart) – presents weighted relationships of flows between nodes



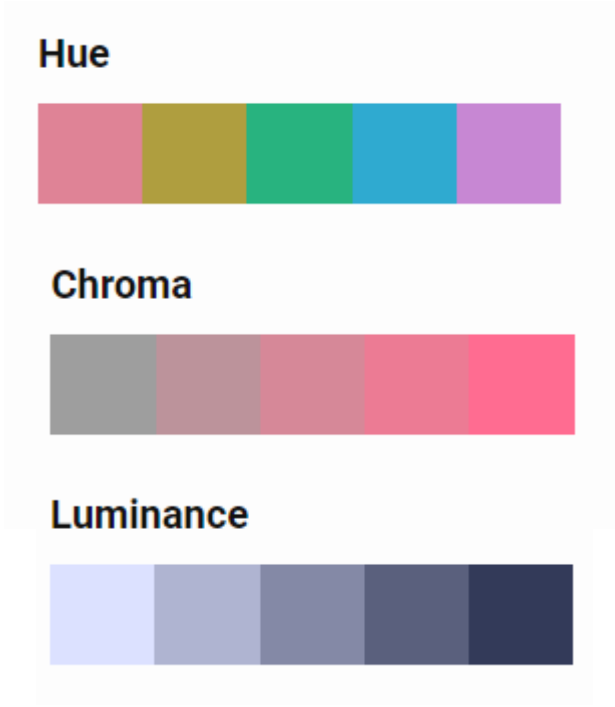
Colors – hue, chroma and luminance (HCL)

Choice of colors is crucial for data visualization.

HCL is a color schema where each color within the HCL color space is defined by a triplet of values:

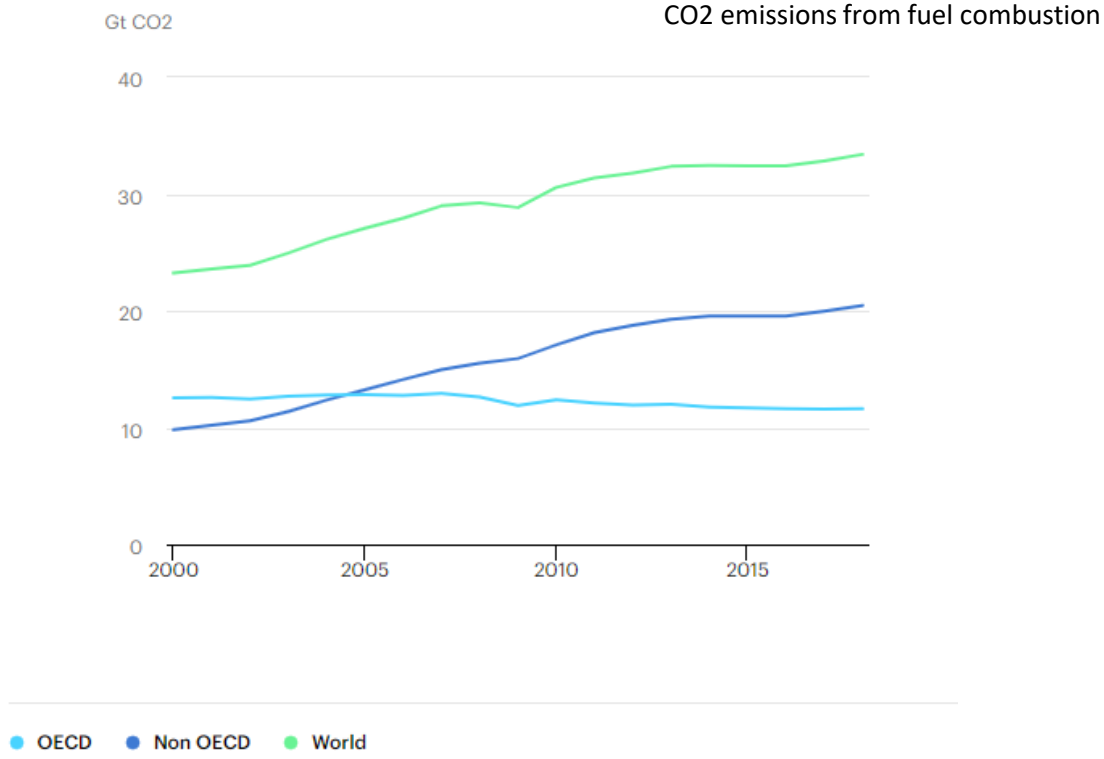
- Hue: defines the color,
- Chroma: defines the colornfuless (intensity of color as compared to gray),
- Luminance: defines the brightness.

Example show how property can vary while keeping the other two properties fixed.



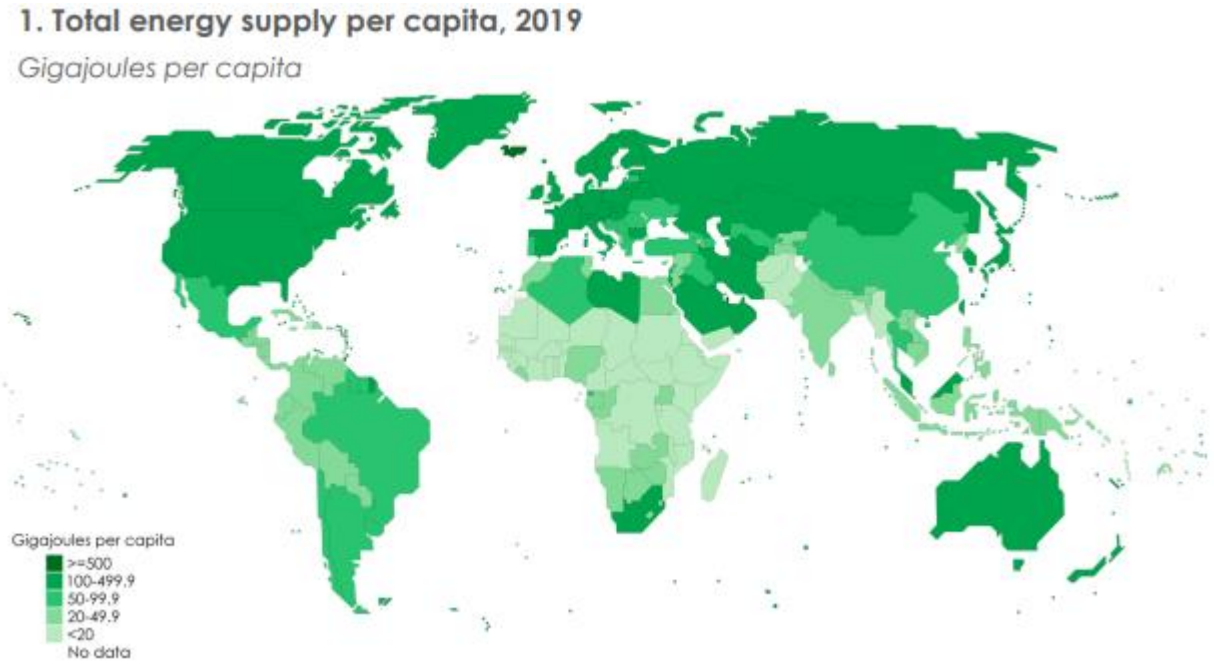
Qualitative palette

- Data type: qualitative
- Purpose: distinguish unorder data
- Different hue



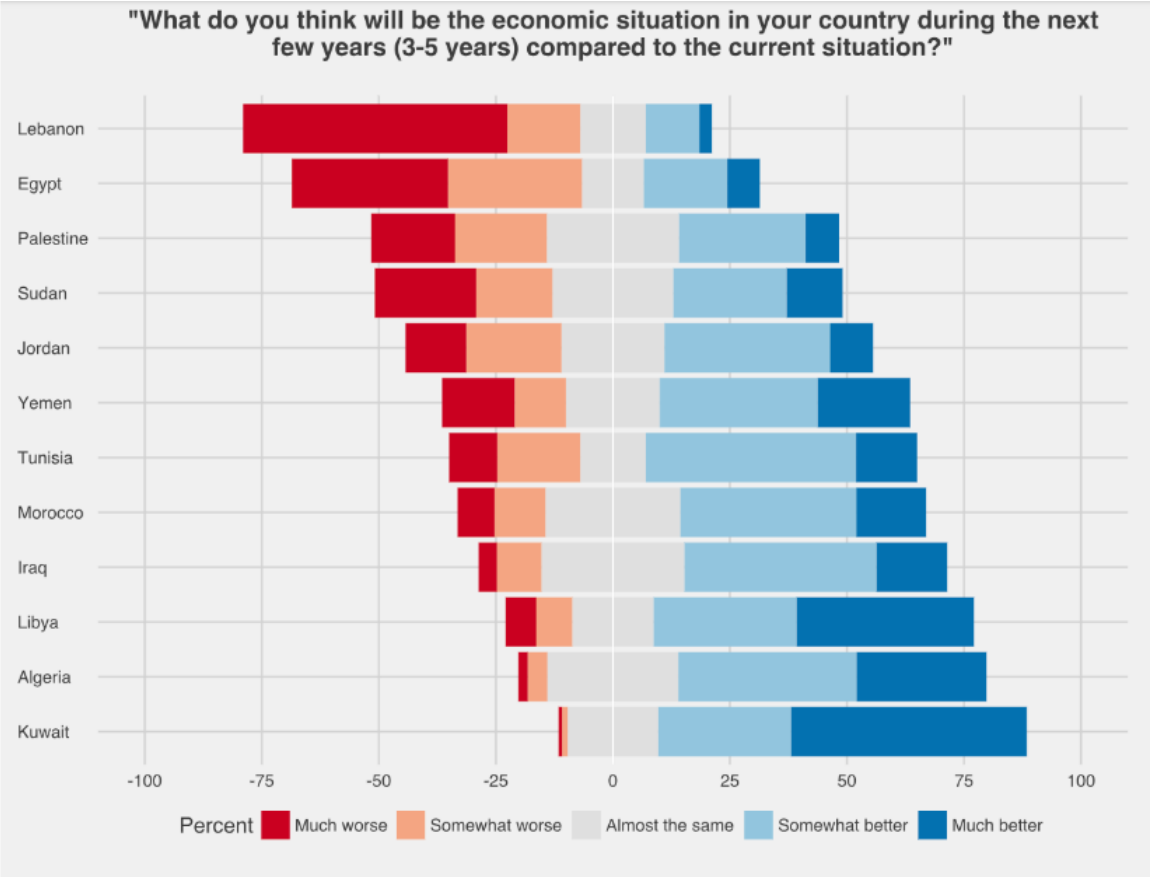
Sequential palette

- Data type: sequential
- Purpose: showing order
- Different chroma or luminance



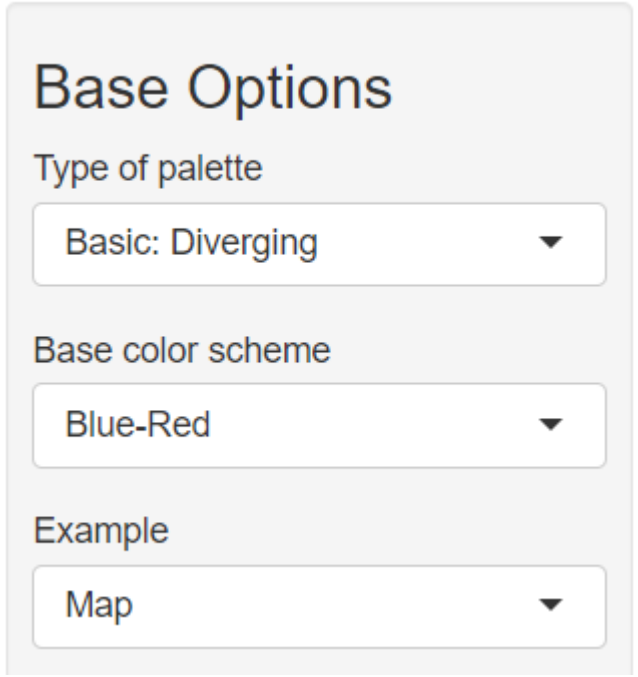
Diverging palette

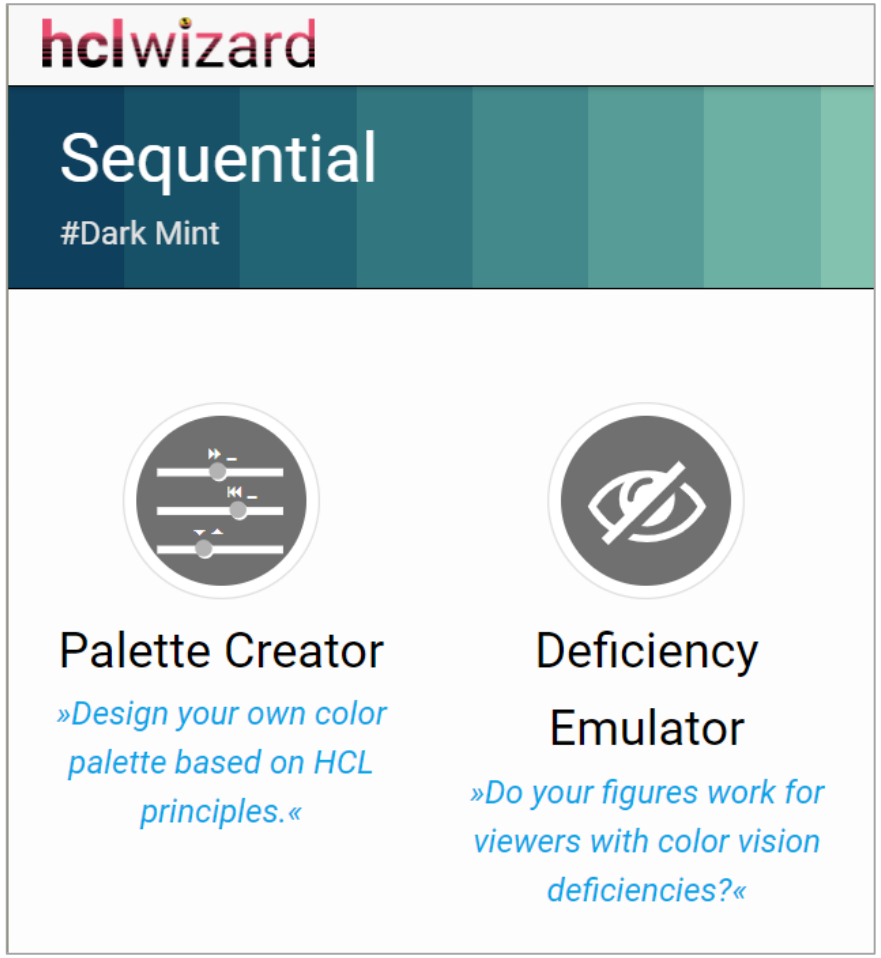
- Data type: diverging
- Purpose: showing above or below a midpoint
- Different chroma or luminance, with 2 hues



Ready to use palettes

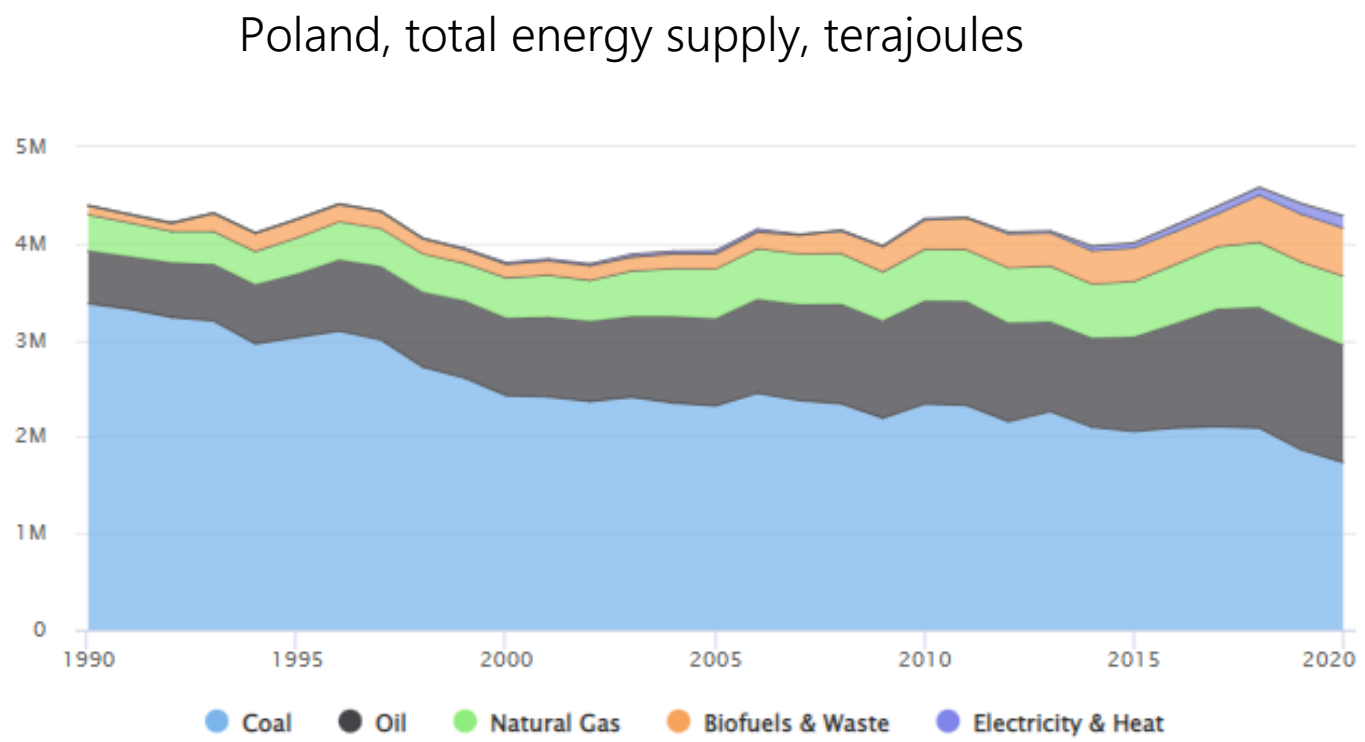
Many websites provide automatic color palette generators as well as testing your choice of colors color vision deficiencies (recommended for all visuals!).





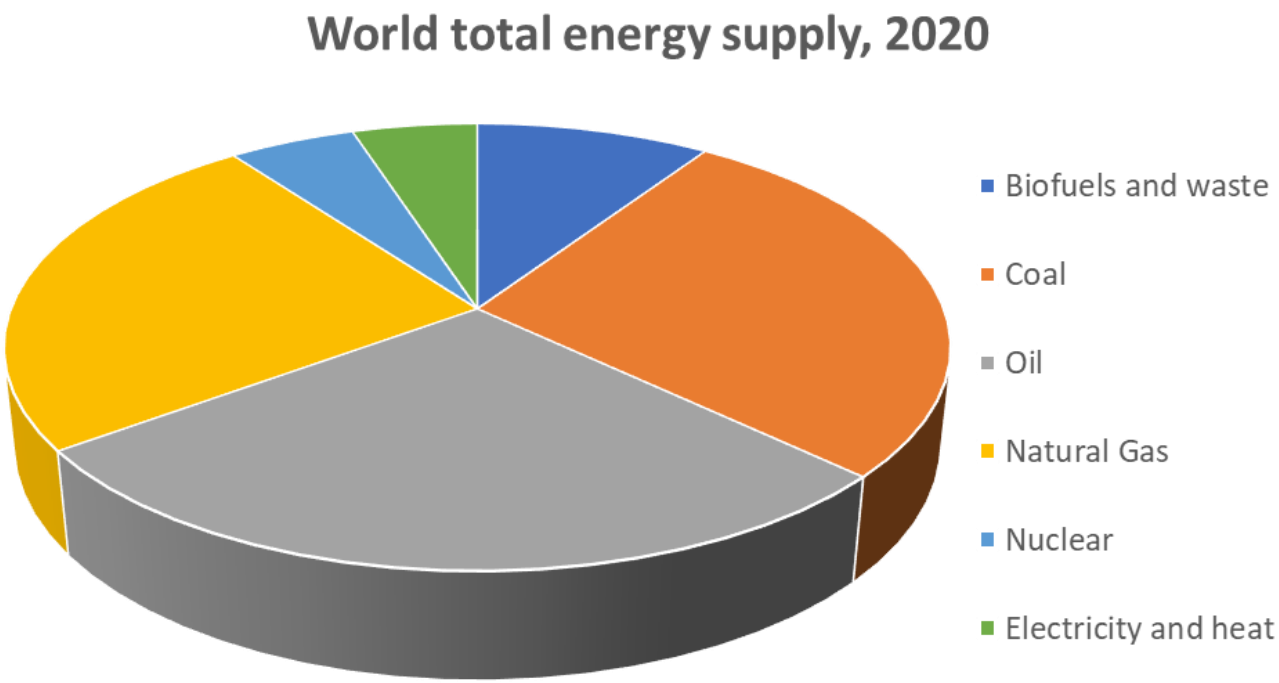
Examples of charts

Good chart is easy to understand

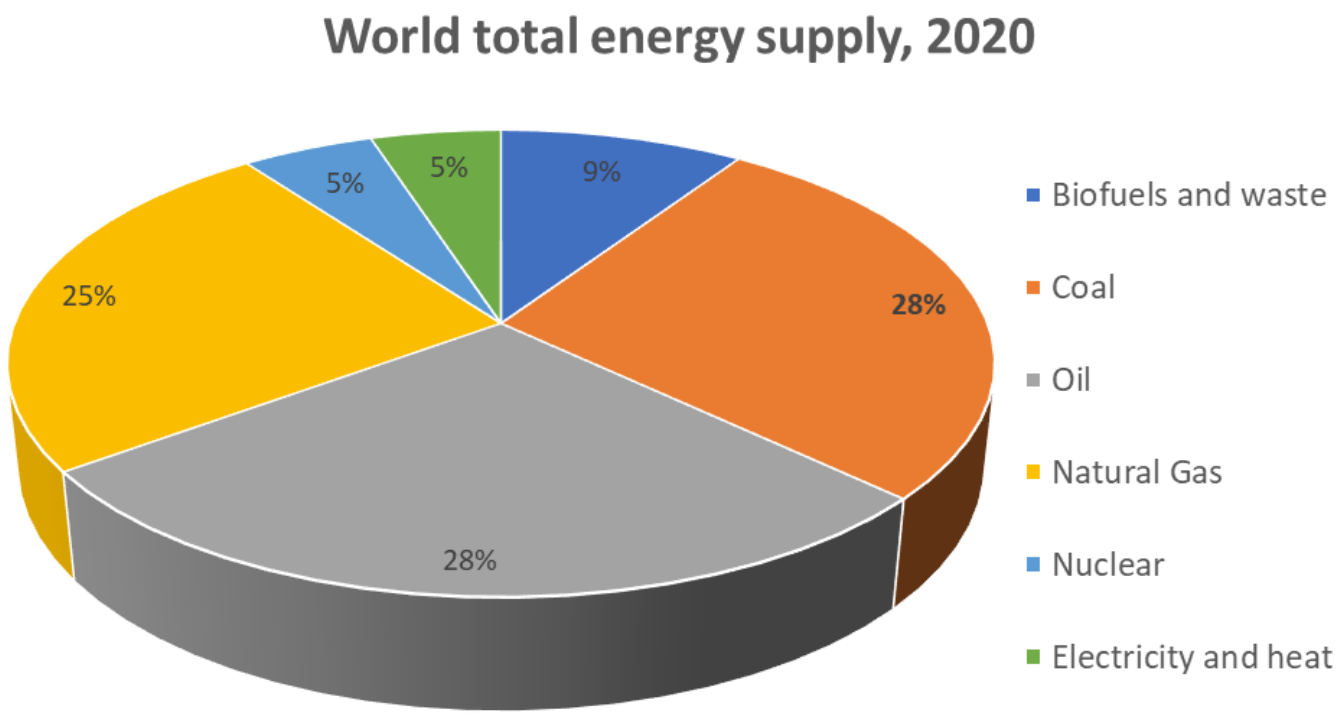


Using 3D – pie chart example

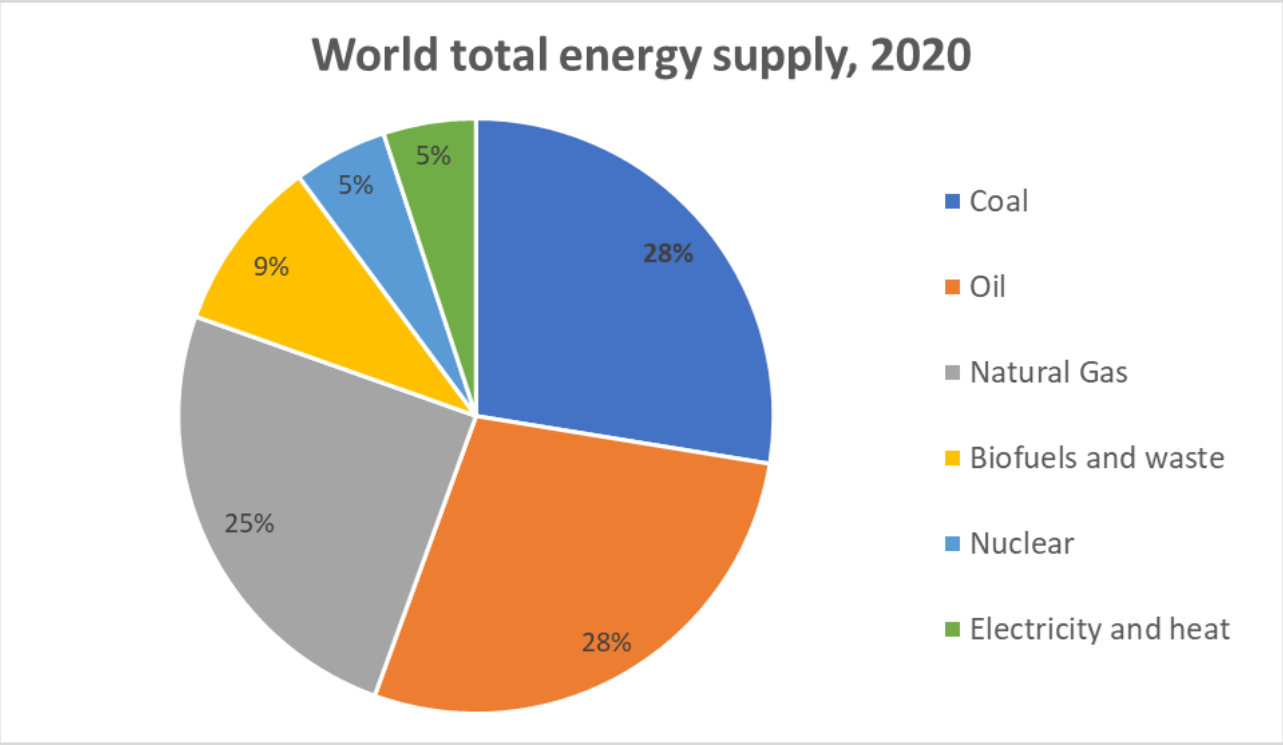
- Which fuel has the biggest share?



Using 3D – pie chart example

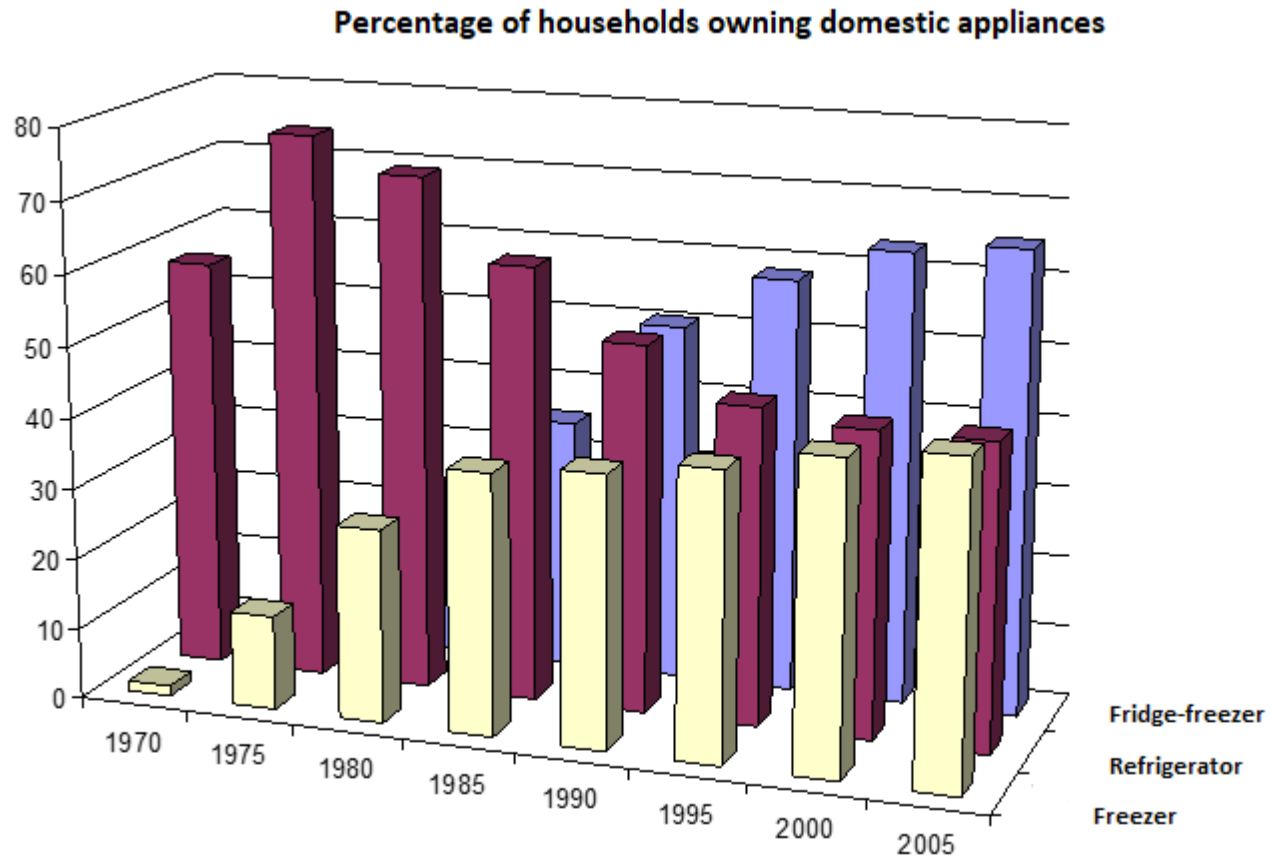


Switching to 2D – pie chart example

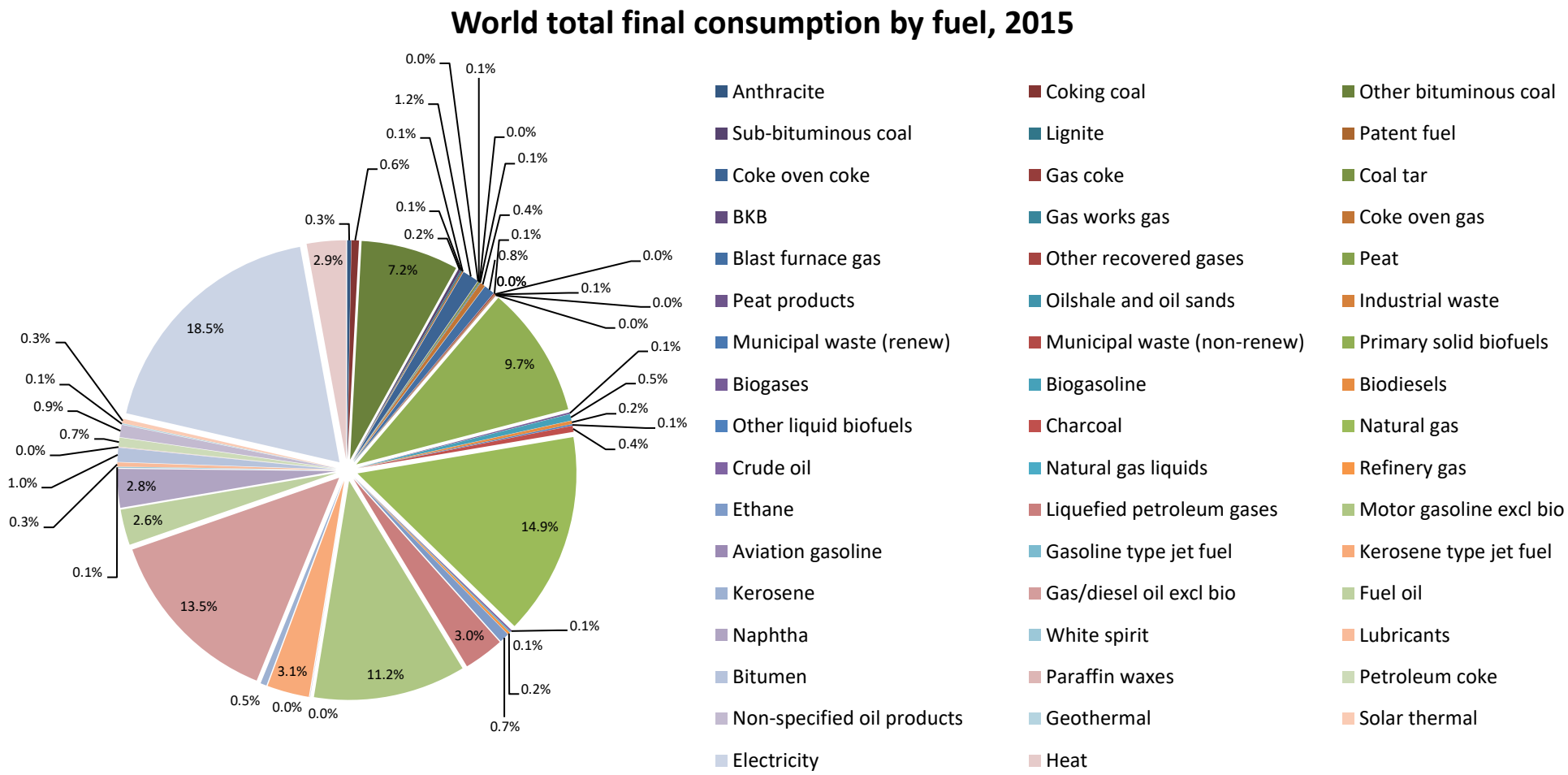


3D data – bar charts

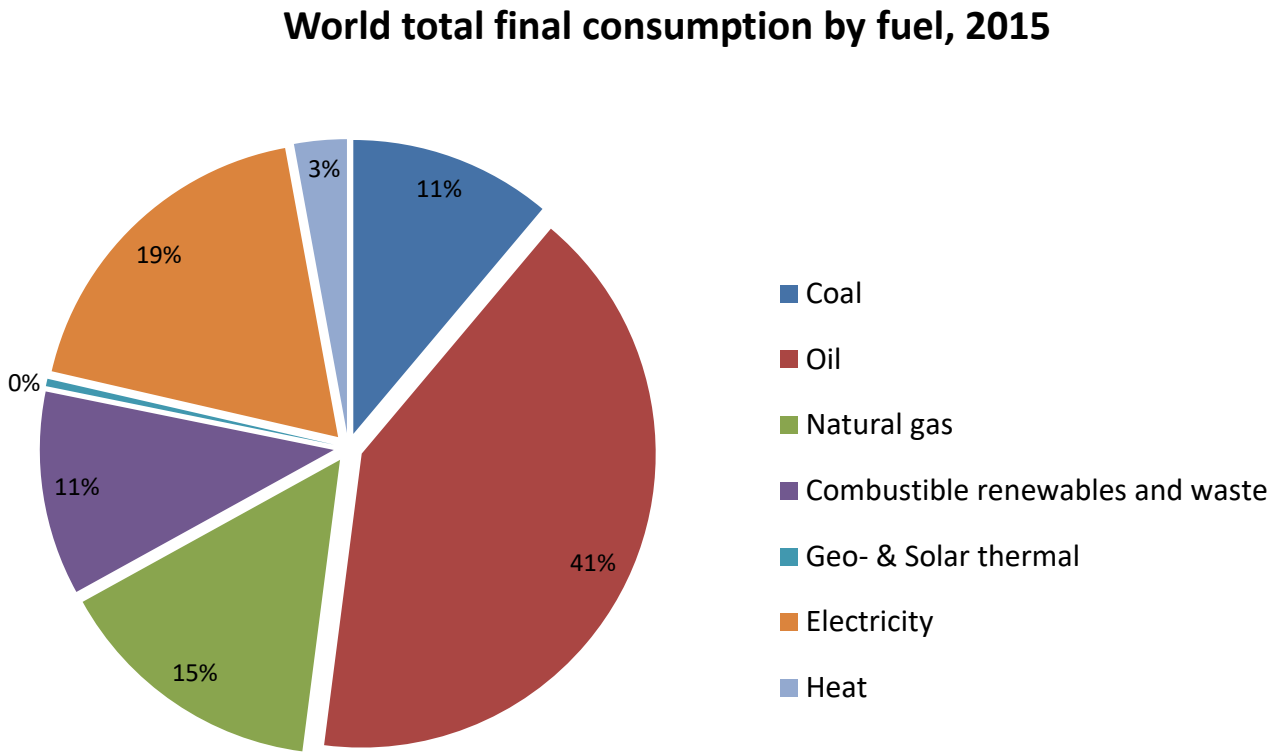
What was the percentage of households owning fridge-freezer in 1980?



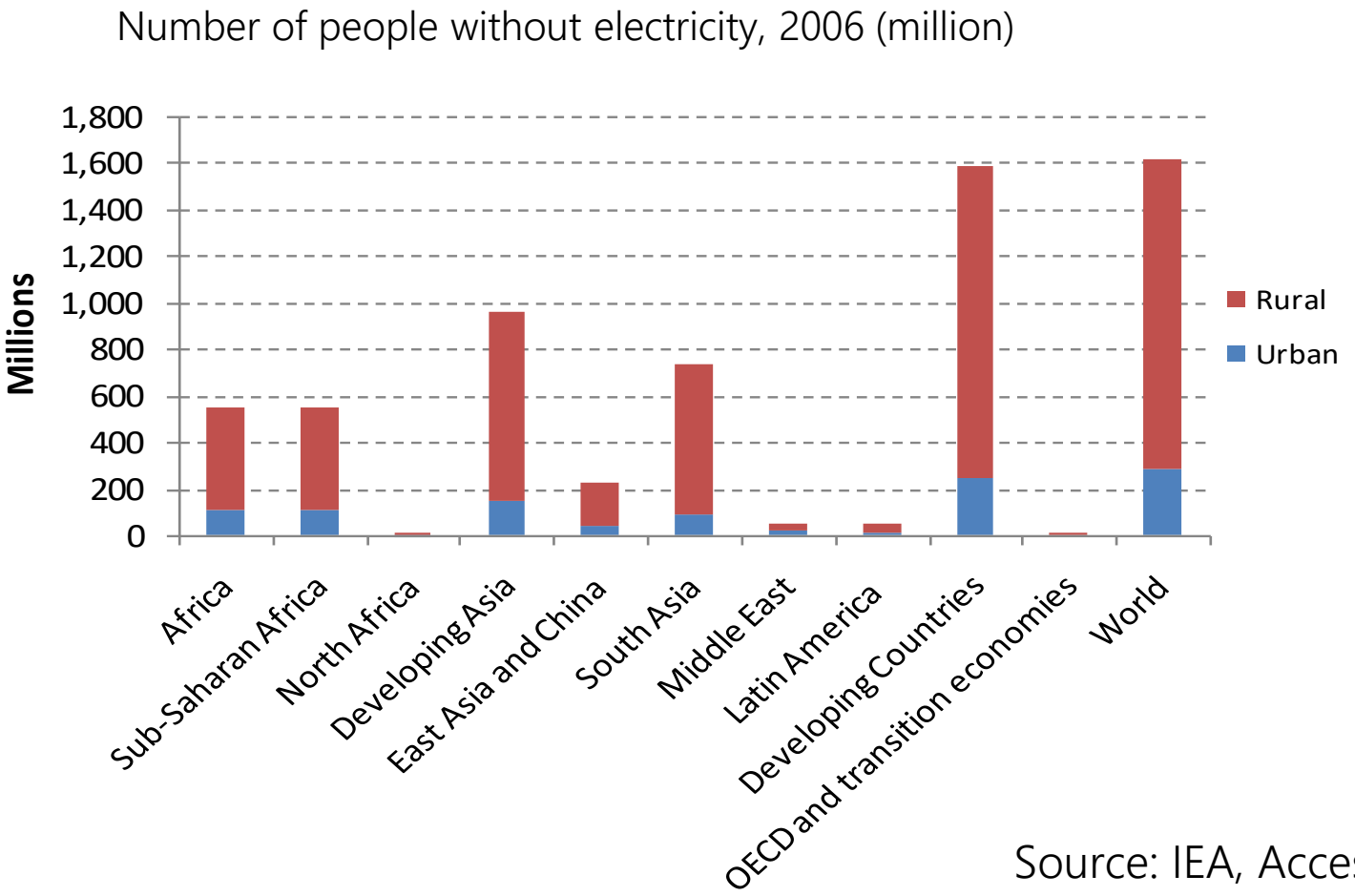
Detailed charts



Aggregated data



How the data could be presented in more readable format?



Source: IEA, Access to electricity

Table are important part of data dissemination

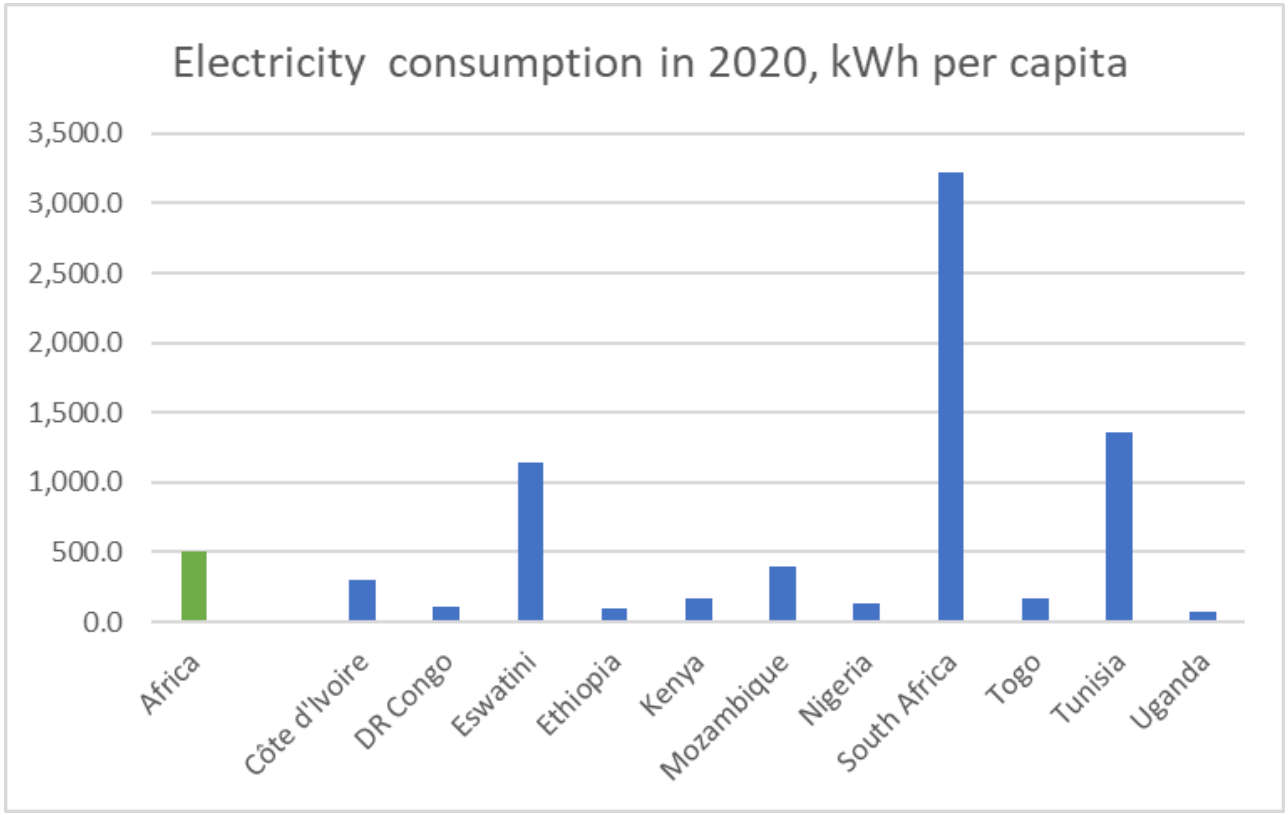
Number of People without electricity, 2006 (million)

	Urban	Rural	Total
Africa	110	443	553
Sub-Saharan Africa	109	439	548
North Africa	1	6	7
Developing Asia	145	822	966
East Asia and China	39	189	228
South Asia	88	650	739
Middle East	17	25	42
Latin America	7	38	45
Developing Countries	**248**	**1,342**	**1,590**
OECD and transition economies	**<1**	**8**	**8**
World	**284**	**1,339**	**1,623**

Source: IEA, Access to electricity

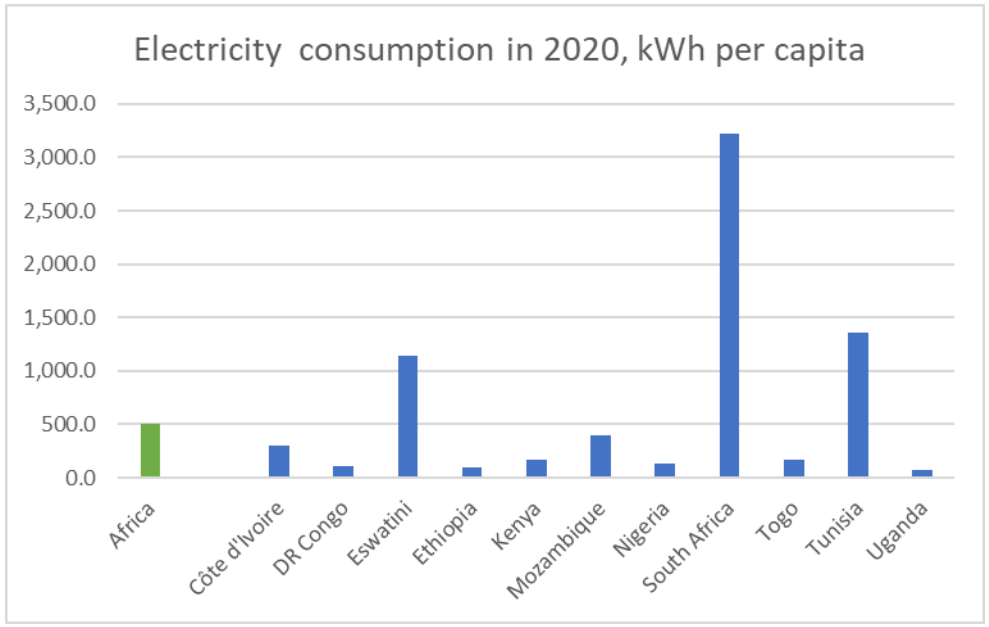
Example of using bar chart

Vertical bars

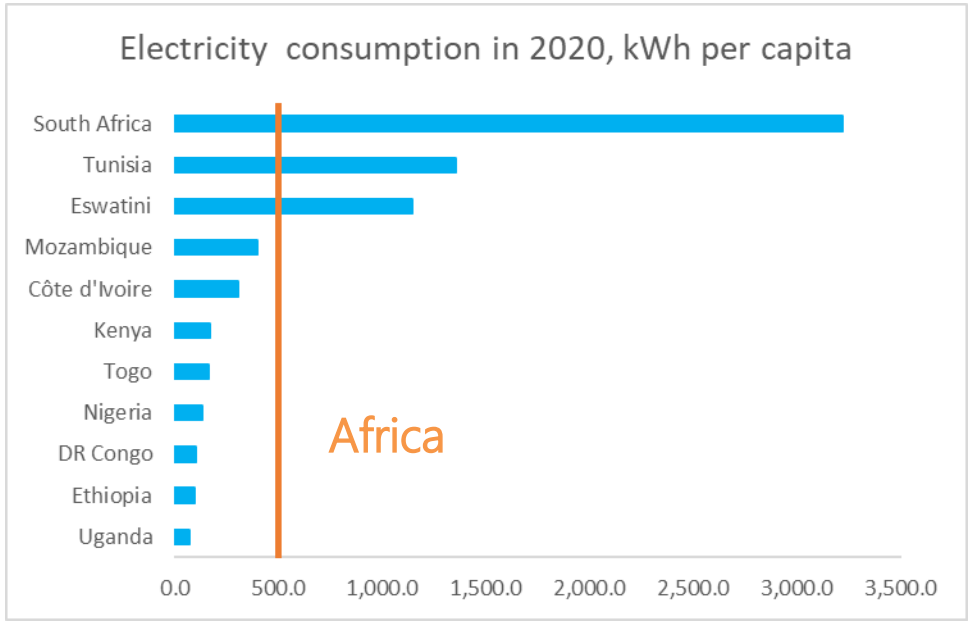


Example of using bar chart

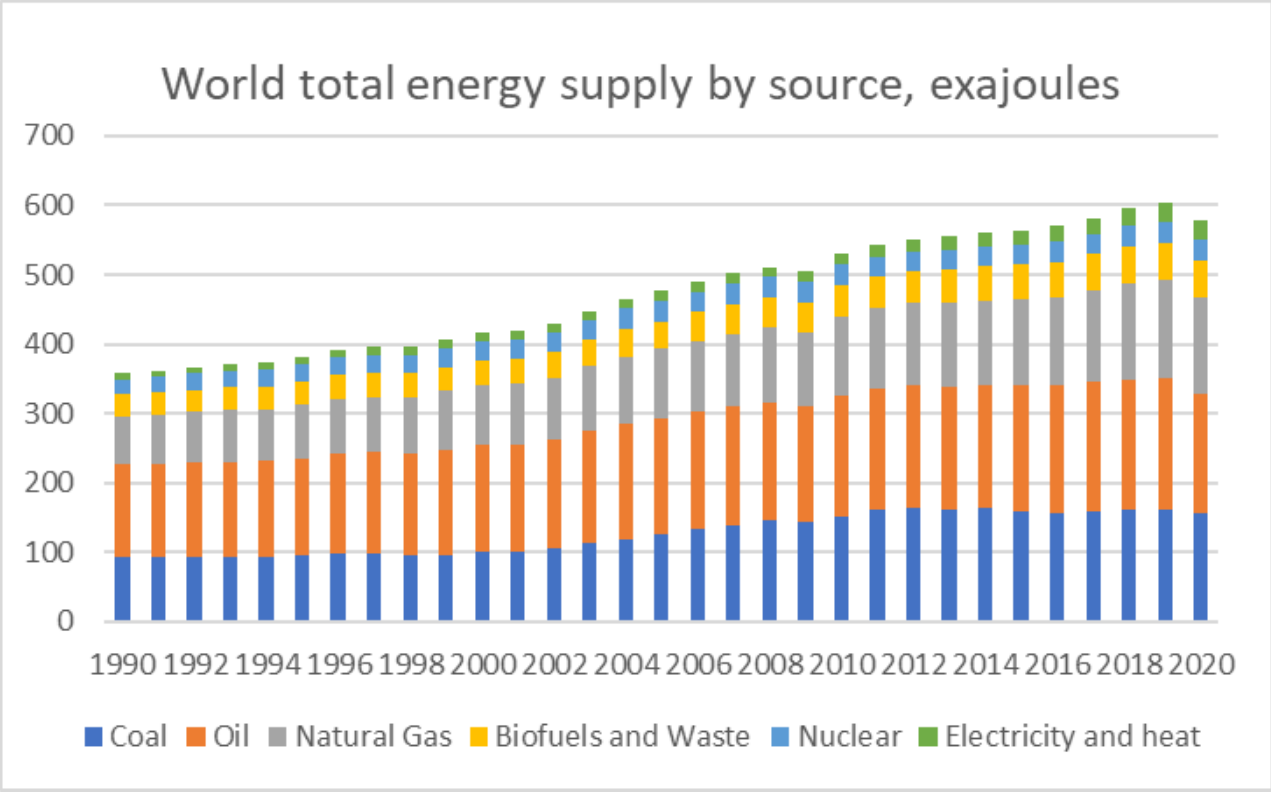
Vertical bars

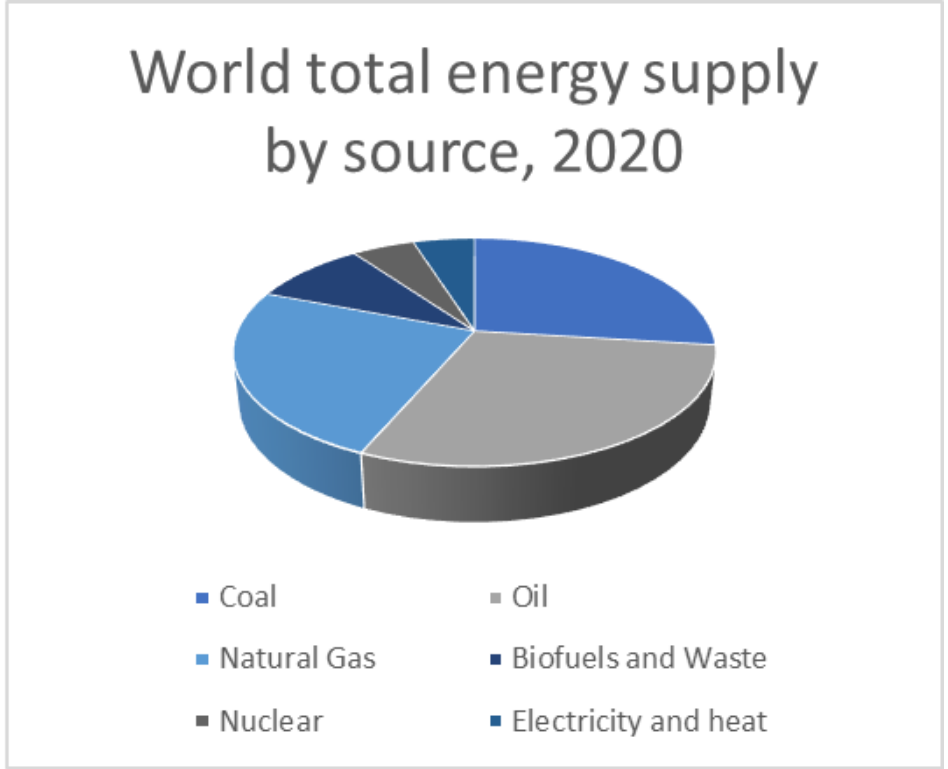


Sorting by values

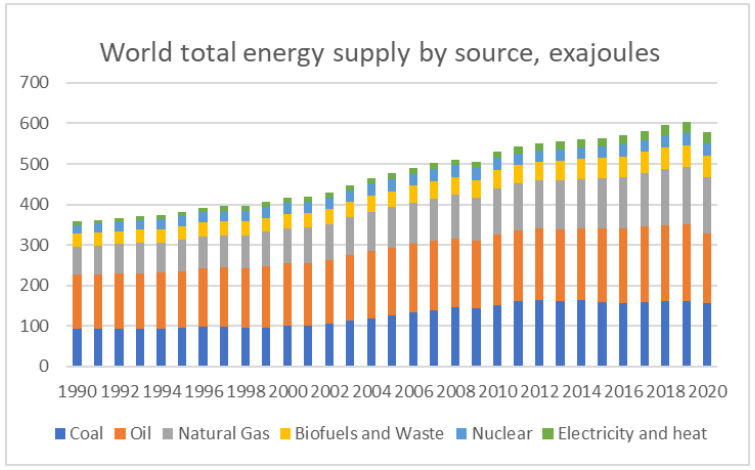


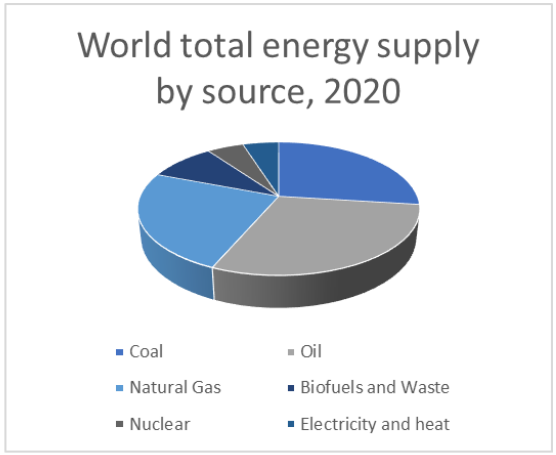
Multiple charts

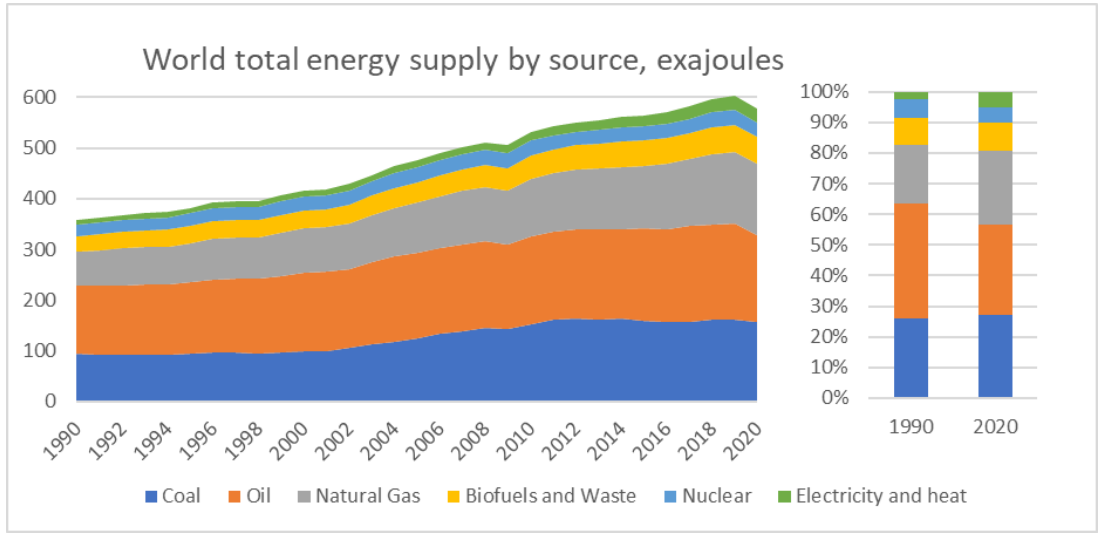




Multiple charts



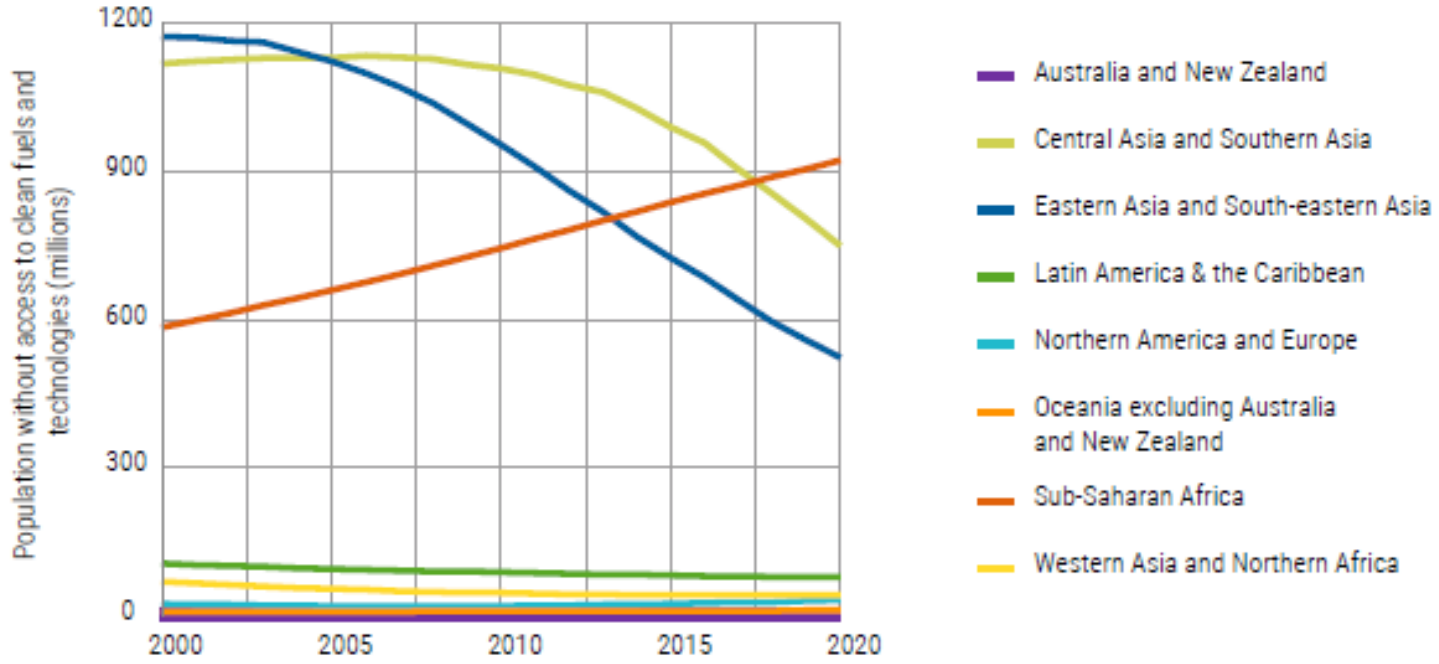




Storytelling with charts

Example: clean cooking in sub-Saharan Africa

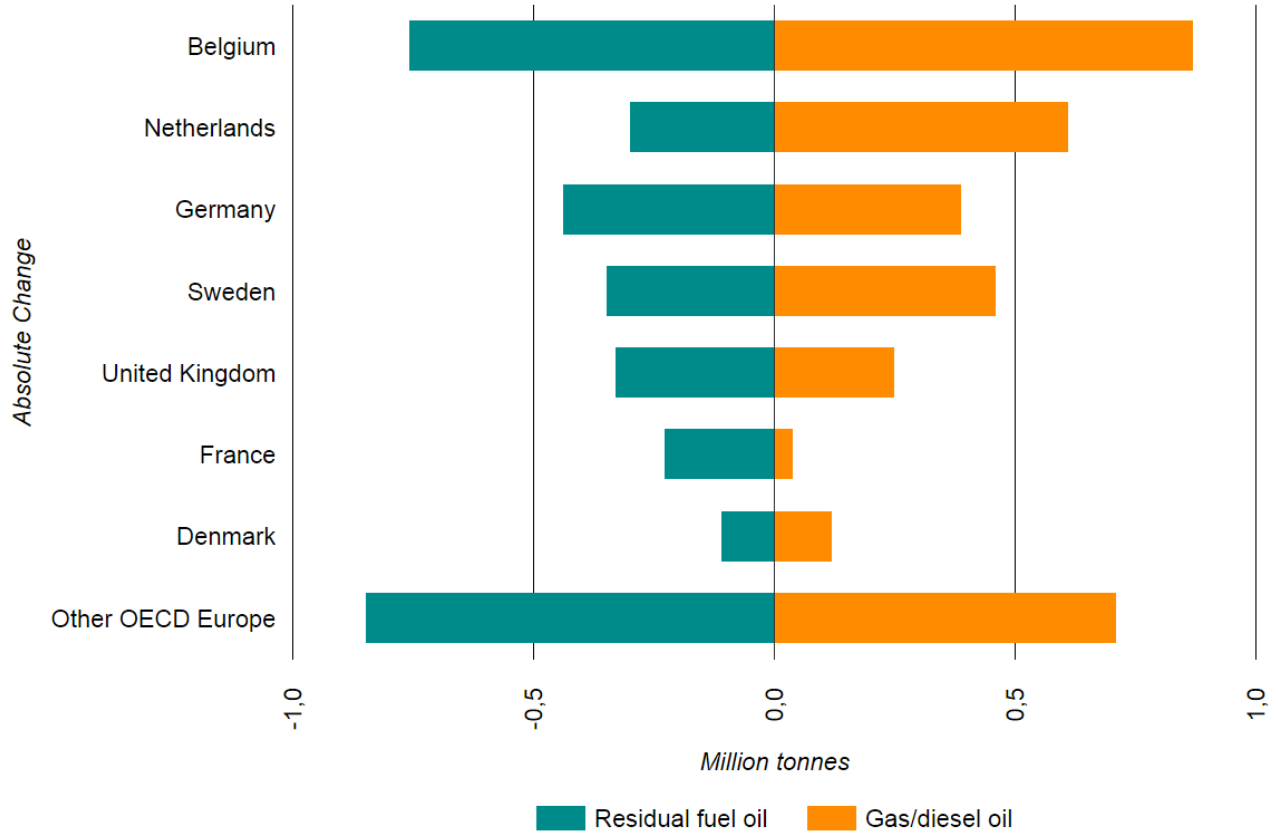
Figure 2.5 • Number of people lacking access to clean fuels and technologies, by region, 2000-20



Source: SDG7 Tracking progress report

The access deficit in sub-Saharan Africa rose by more than 50 percent since 2000 to 923 million in 2020.

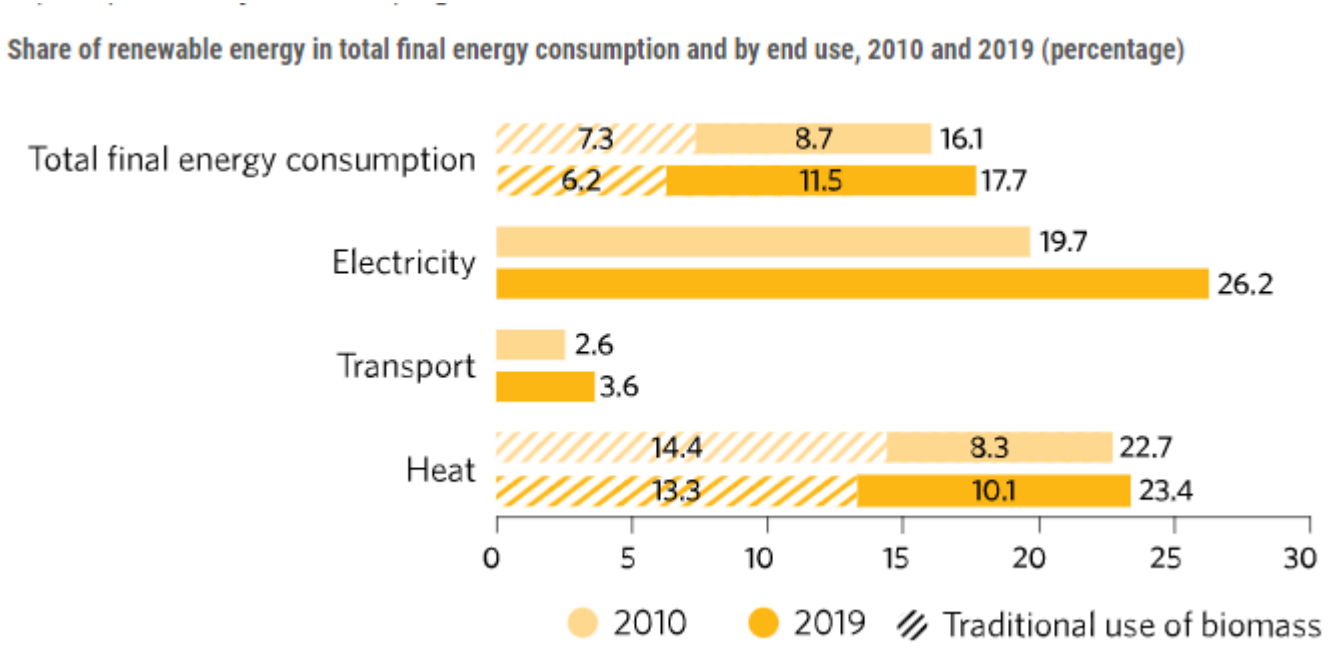
Example: Switch from fuel oil to gas diesel in international marine bunkers in 2015



Deliveries to international marine bunkers in OECD Europe shifts from fuel oil to gas diesel oil as the result of new legal requirements related to changes in the sulfur content in Sulfur Emission Control Areas.

Source: IEA, Key oil trends, 2015

Highlighting different messages

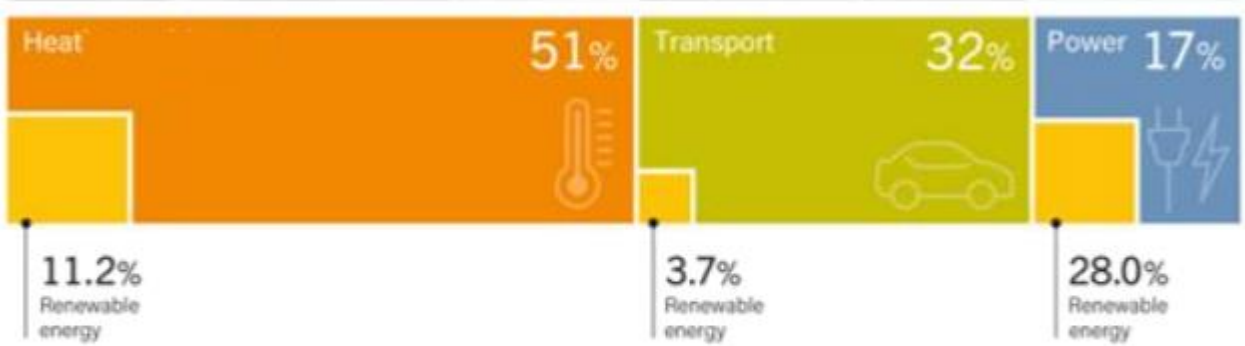


The electricity sector continues to see the fastest progress: the share of renewables in that sector increased from 19.7 per cent in 2010 to 26.2 per cent in 2019.

Source: UNSD, *The Sustainable Development Goals Report 2022*

Highlighting different messages

Renewable Energy in Total Final Energy Consumption, by Final Energy Use, 2019



Note: Data should not be compared with previous years because of revisions due to improved or adjusted methodology.

Source: Based on IEA data.

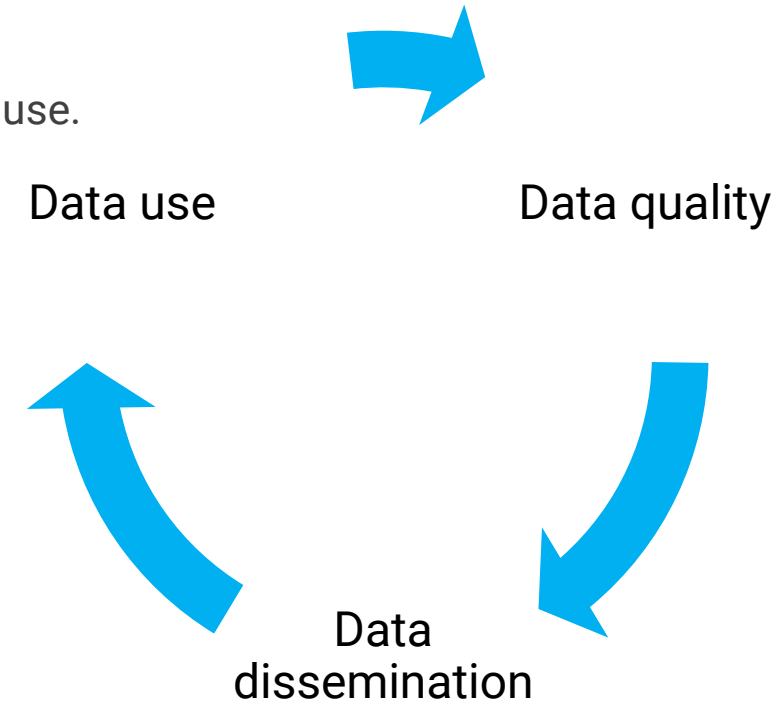
Renewables uptake is uneven across end uses, the greatest urgency is needed heat and transport end uses.

Source: REN21, *Renewables global status report 2023 collection*

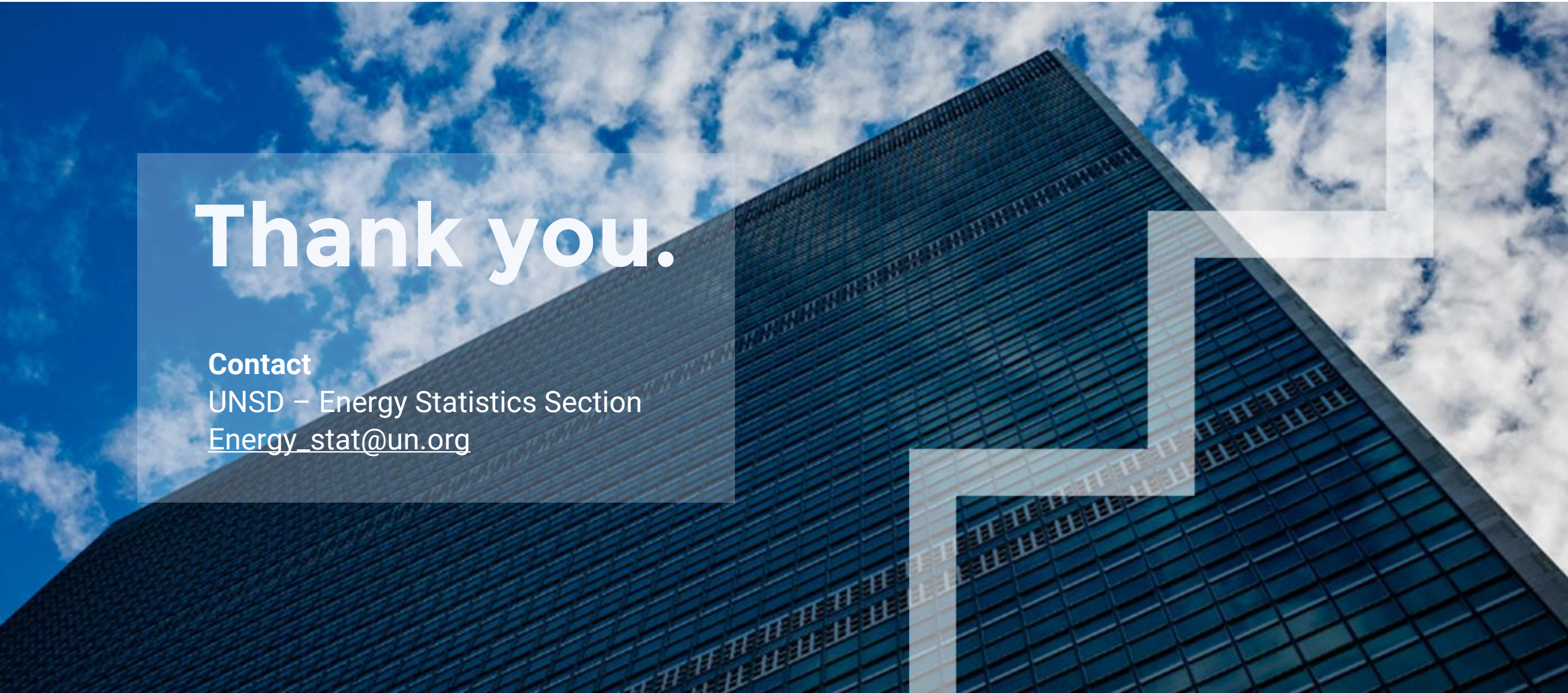
Conclusion

Dissemination of statistics

- Tabular data, useful for many users, maybe difficult to understand.
- Charts are powerful way of conveying messages.
- Best charts are charts easy to understand.
- There is a virtuous circle between data quality, dissemination and use.



United Nations | Statistics Division



Thank you.

Contact
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