VISUALIZING

THE EUROPEAN UNION'S ENERGY DEPENDENCY

Europe's dependence on energy imports has become a major source of criticism in **2022**, but is it actually a cause for concern?

This infographic visualizes the EU-27's energy dependence, as well as its top import partners.

Energy dependency

0% 100%

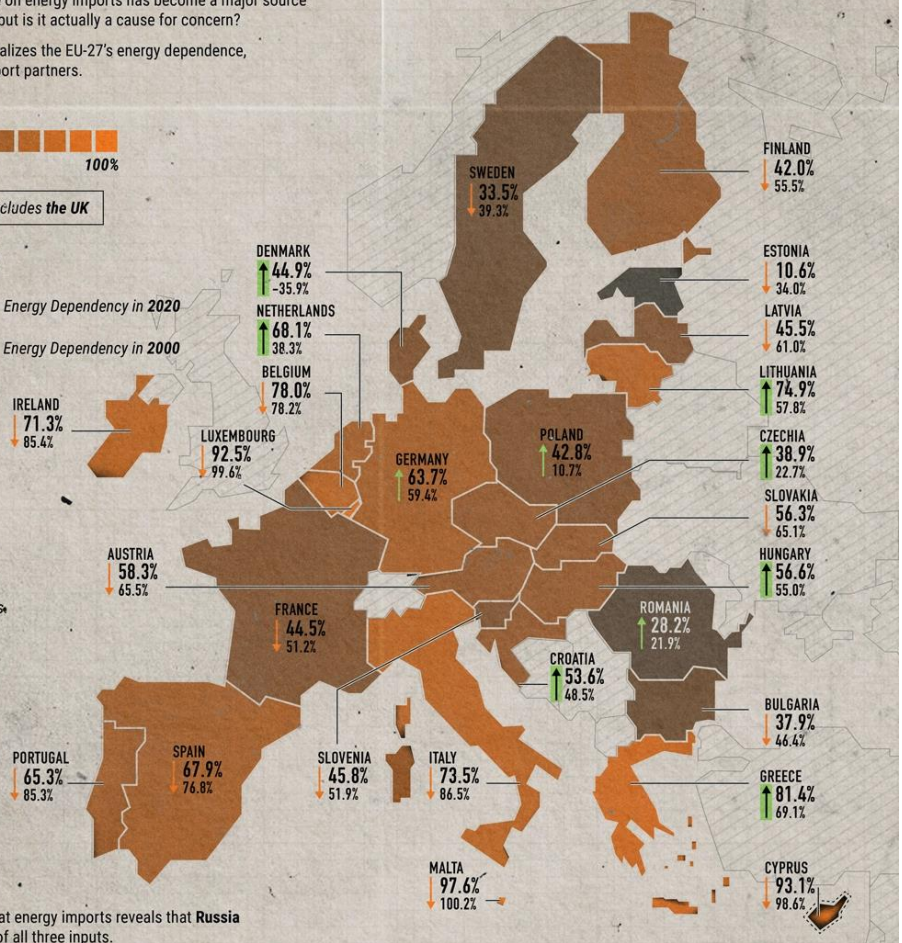
*The EU-27 excludes **the UK***

EU AVERAGE

57.5% *Energy Dependency in **2020***

56.3% *Energy Dependency in **2000***

***Energy dependence** measures the extent to which a country relies on imports to meet its energy needs.*



Taking a closer look at energy imports reveals that **Russia** is the main supplier of all three inputs.

EU IMPORTS

CRUDE OIL

ALGERIA 2.4%

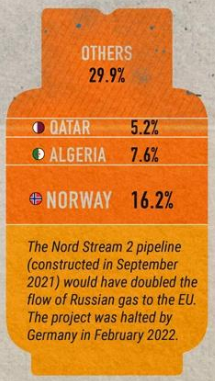
RUSSIA 26.9%

SOLID FUEL (COAL)

SOUTH AFRICA 2.8%

RUSSIA 41.1%

NATURAL GAS



Source: Eurostat, eia, Statista

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VISUALCAPITALIST.COM

Visual source/link- https://www.visualcapitalist.com/visualizing-the-eus-energy-dependency/

Name- Tirtha Tilak Pani

Title of the Visualization-

'The European Union's Energy Dependency

The creator aims to answer whether Europe's energy imports have become a significant concern in 2022. We can see that the website created this visualisation on March 22, 2022. The Russian invasion of Ukraine began on February 24, 2022. Hence, it is safe to assume that the website presented this visual in the context of the Russian invasion of Ukraine.

Pros-

1. Several elements in the visualisation, such as the lightning symbol at the top right corner and the containers of crude oil, solid fuel and Natural Gas, all cater to the viewer's mental model regarding energy.
2. Each encoding in the visualisation is visible, and the arrows convey the message regarding the increase or decrease of energy imports.
3. A proper explanation for all the complex terms and colours used has been provided.
4. Suppose we recall the Metro station map (Harry Beck,1933). In this case, we see a similar scenario where creators have chosen to let go of geographical accuracy to make a point. It has worked well because geographical accuracy does not play any role in the context in which this visualisation has been presented.

Cons and Suggestions-

We know that good visualisations provoke thoughts in the mind of the viewer. They tell a good story. I feel that we must also critique all visualisations concerning the point that they are trying to convey. So, if we look at this from the context of the Russian invasion-

1. It is common knowledge that increased energy dependency is unsuitable for a country. But, over here, it has been represented by an arrow highlighted green. Similarly, the decrease has been described by orange arrows. The colours used do not reflect reality.

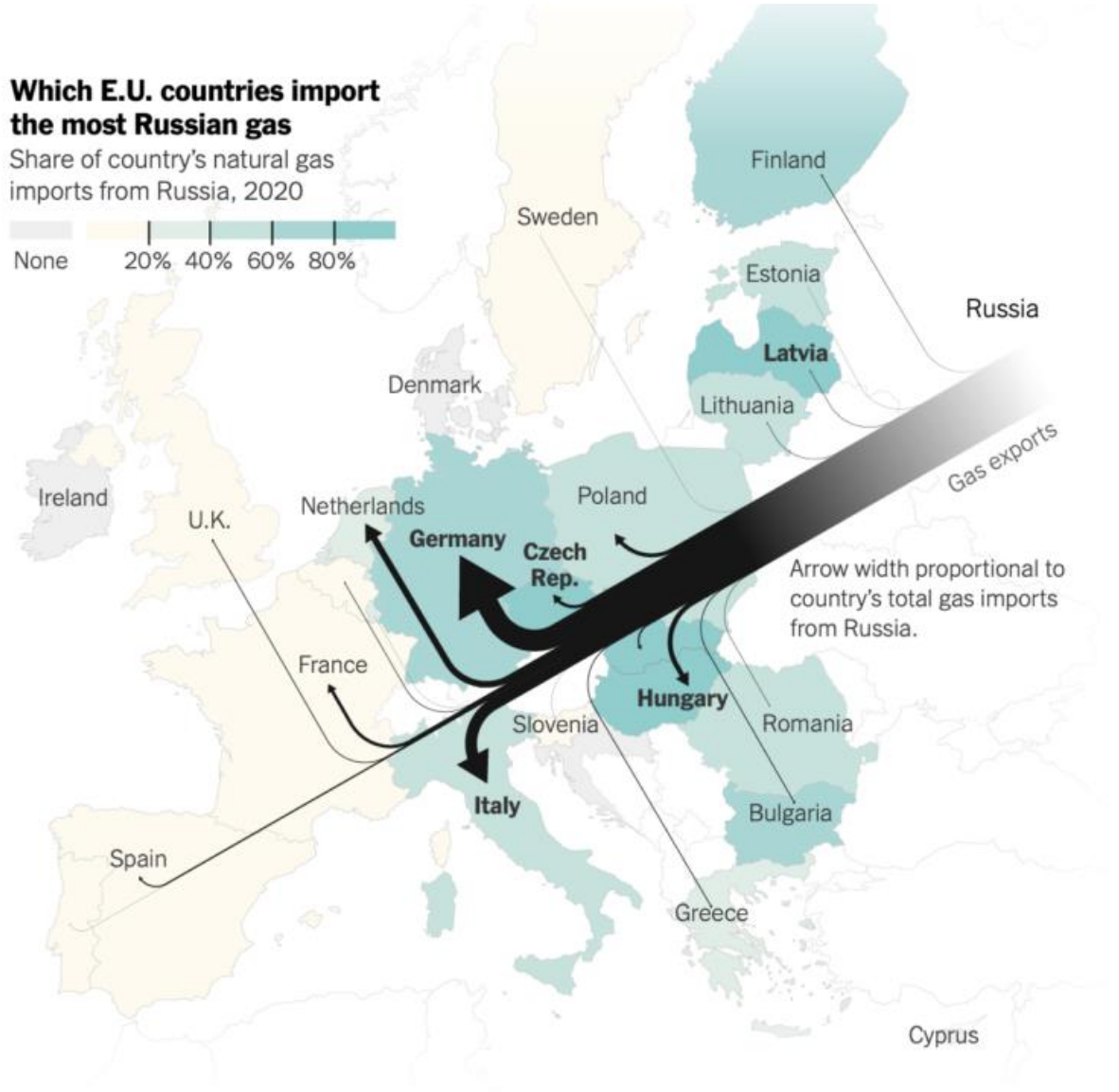
2. The statistics for 2000 and 2020 have been given, but these are direct statistics. It would have been much better if they had shown a derived figure, i.e. the percentage increase or decrease. They could have been highlighted in red or green depending on whether they indicate an increase or decrease in energy dependency.
3. While the shapes at the bottom cater to the viewer's mental model, they represent percentages improperly. The creator could have used simple pie charts in their place.
4. If we zoom in on the map into the island of Cyprus, we can observe that it has a non-uniform colour pattern, whereas all other countries have been filled with a single colour.
5. While the graphic aims to draw attention to the fact that the EU-27 countries heavily depend on Russia for their energy needs, it does not visually represent it successfully. A picture is worth a thousand words. So, it would have been much better if the creator had described the insights using a few additional visualisations-

    a) They could have ranked the countries by their energy dependence on Russia using a bar chart.

    b) When it comes to gas pipelines, they could have created a visual similar to the one shown in the link below. Not only does this accurately show the origin and the path through which the energy is transported, but it depicts that all that gas comes from Russia. It also gives the viewer a sense of gas dependency per country.

    Link- https://flowingdata.com/2022/02/17/map-of-russian-gas-exports/

    Image below



Source: EuroStat and the British Department for Business, Energy & Industrial Strategy • Note: Austria did not report the source of its natural gas imports in 2020. Data includes both piped and liquefied natural gas.

Class Exercise-

Parameters| Data Type| Visual Property (Channel)|

Graphical Element (Mark)

Proper/Improper Representation

1. Energy Dependency | Categorical data | Colour, Density |
   Saturation and hue reflect the increase in the percentage of energy dependency
   Improper representation- The increase in saturation and the variation in the Hue do not resonate with the semantics of the data. While all the other countries have a uniform colour filling, the box for Cyprus has a non-uniform colour filling.
2. Energy Dependency in year XXXX| Quantitative Data |Text, Size, Texture
   Here, (Text, Size) refer to the number in percentage and the size in which it has been represented in the visual. Texture refers to the repeated use of the '%' symbol.
   Improper representation- The values for the later years have a bigger font size than those for earlier years. The '%' could have been avoided because all figures are in percentages only. Instead, the percentage increase or decrease could have been shown.
3. Arrows| Derived Categorical Data| Pattern, Orientation, Shape, Enclosure
   Here, the arrows are a repeating pattern where there is a symbol inside an enclosure of colour without any fixed boundary.
   Improper representation- If we look at the data context, the arrows should be placed inside red boxes when there's an increase in energy dependency, and they should be placed inside green boxes when it's a decrease in energy dependency. But, over here, it has not been appropriately represented.
4. Crude Oil/Solid fuel/Natural Gas | Quantitative Data in Each Category |
   Shape, Size, Colour, Enclosure
   Improper representation- The boundaries of the shape are not uniform. It is unclear whether they demarcate areas by the parameter of length or size. The colours used are also improper.
5. Country names | Categorical Data | Texture (Pattern), Symbol, Text

Improper representation- The text takes up much space, and there is no use using both the reader and the flags of the countries to represent them. They could have been represented using their flags, and then a separate legend could have been used to correlate countries and their flags.