

International Energy Trends

A graphical review of historical data.

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Data Focused Approach

- Plenty of data available.
- Historical time series map out trends.
- Existing trends tell a compelling story.
- Trends are the signal – **the news is noise!**
- Media reporting is often factually incorrect.
- Agency reports are often biased.

For the real story head straight to the data.

Telling Stories with Pictures

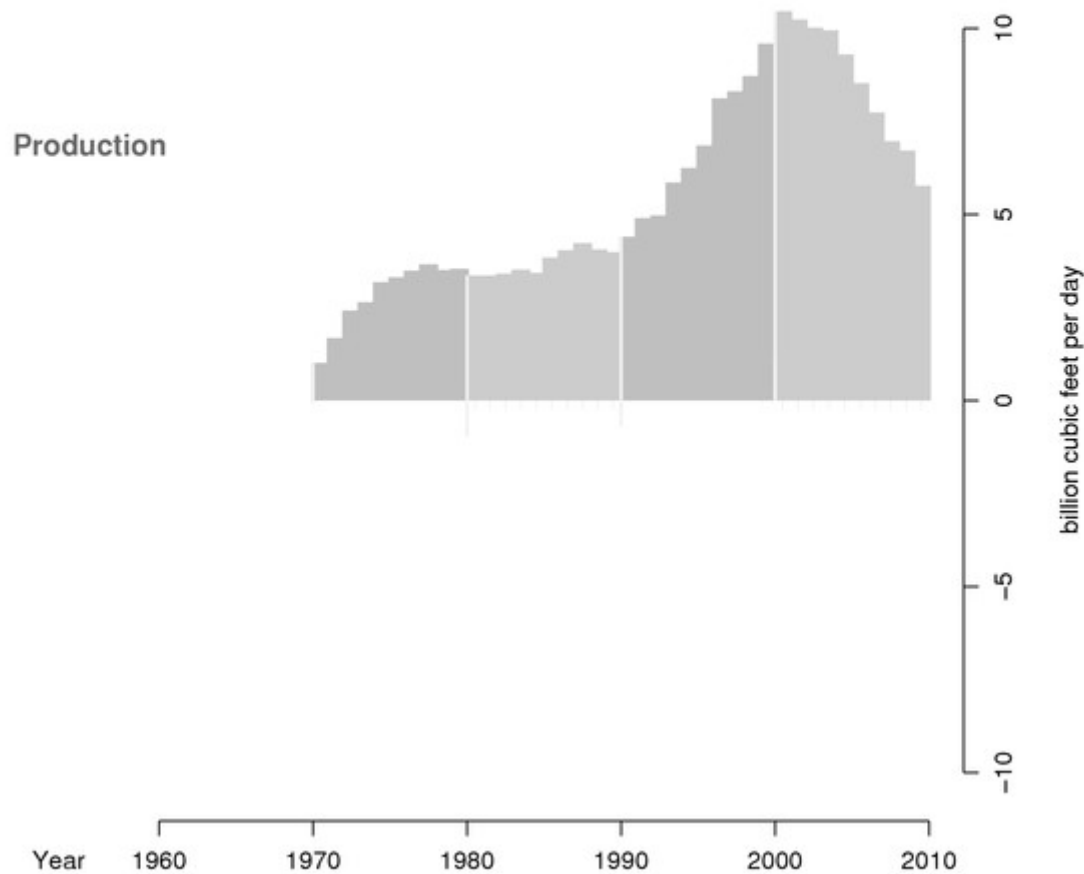
- Humans communicate by telling stories.
- Pictures help us tell those stories.
- Good data graphics allow us to “tell stories” with data.



Cave painting, Lascaux, France, 15,000 to 10,000 B.C.

UK – Historical Gas Production

United Kingdom : Nat. Gas

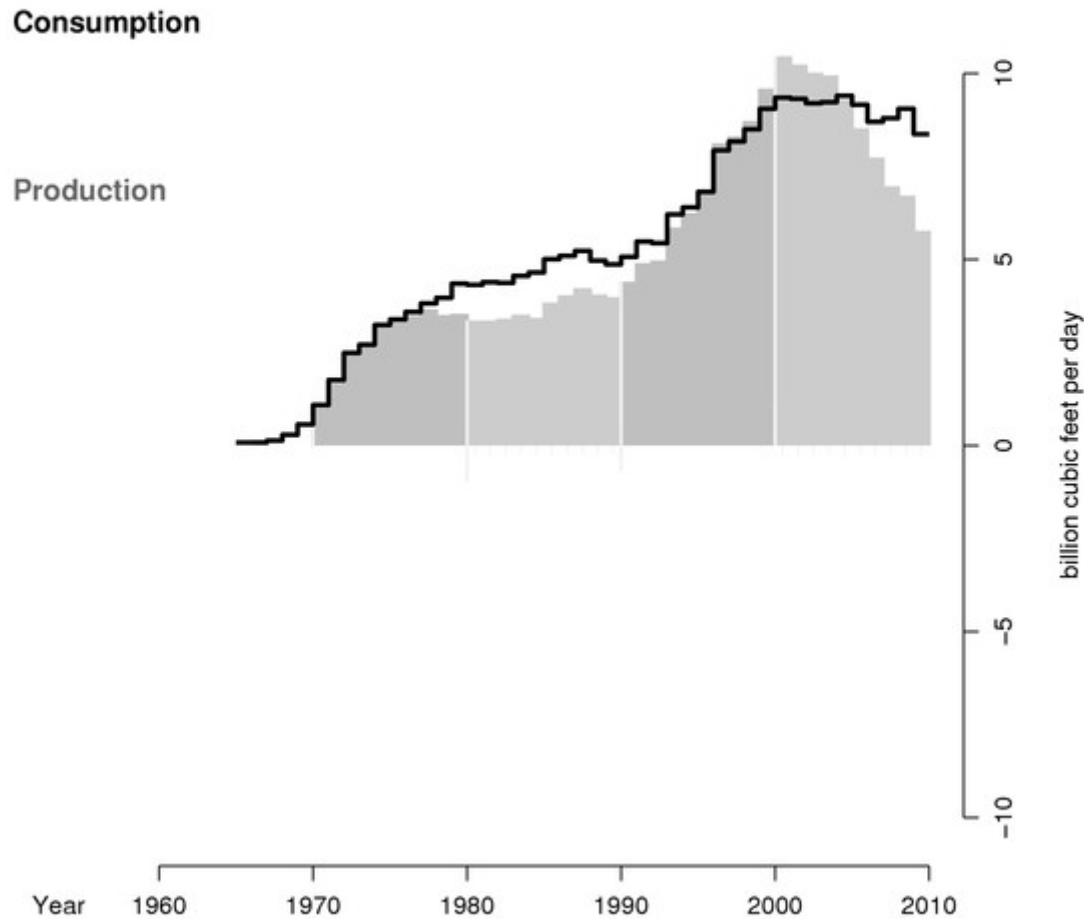


Data: BP Statistical Review 2010 Graphic: mazamascience.com

- 1970's – rising
- 1980's – stable
- 1990's – rapid rise
- 2000's – rapid fall

UK – Consumption

United Kingdom : Nat. Gas

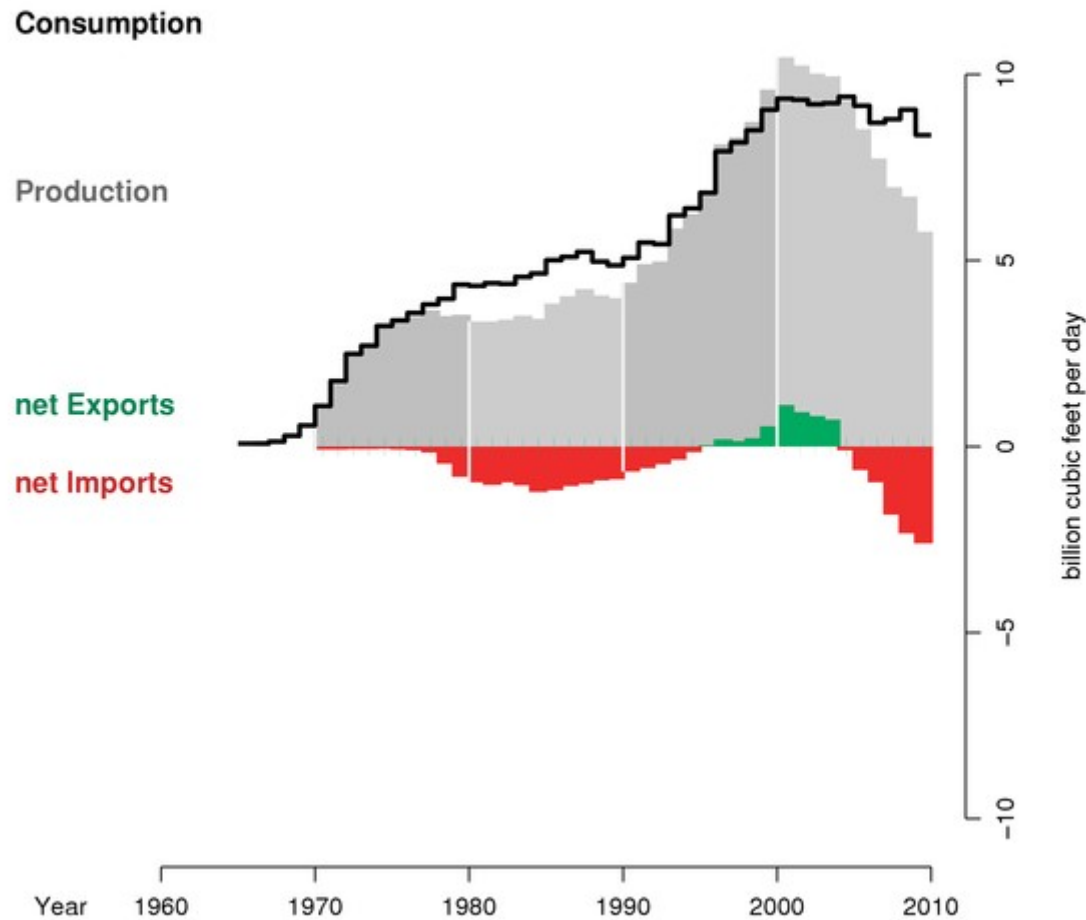


Data: BP Statistical Review 2010 Graphic: mazamascience.com

- 1970's – rising
- 1980's – slight increase
- 1990's – rising
- 2000's – slight decline

UK – Net Exports

United Kingdom : Nat. Gas



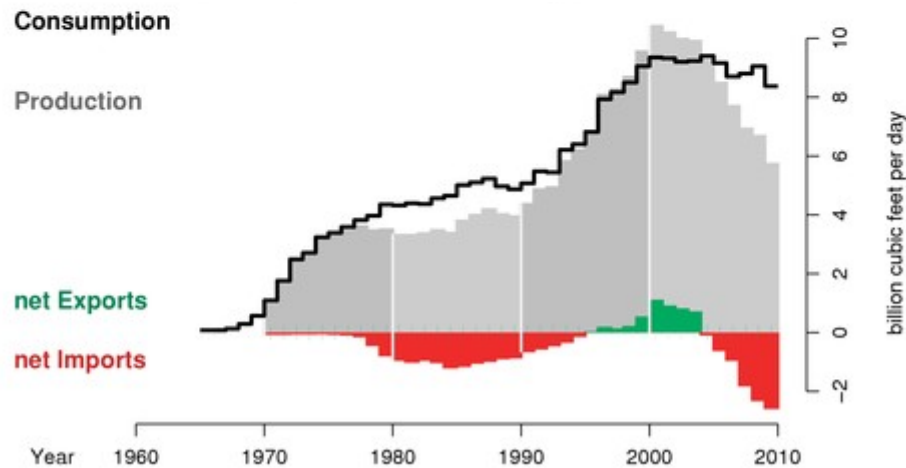
Data: BP Statistical Review 2010 Graphic: mazamascience.com

- 1970's – self sufficient
- 1980's – stable imports
- 1990's – declining imports
- 2000's – increasing imports

Dutch policy emphasized “small fields” first.



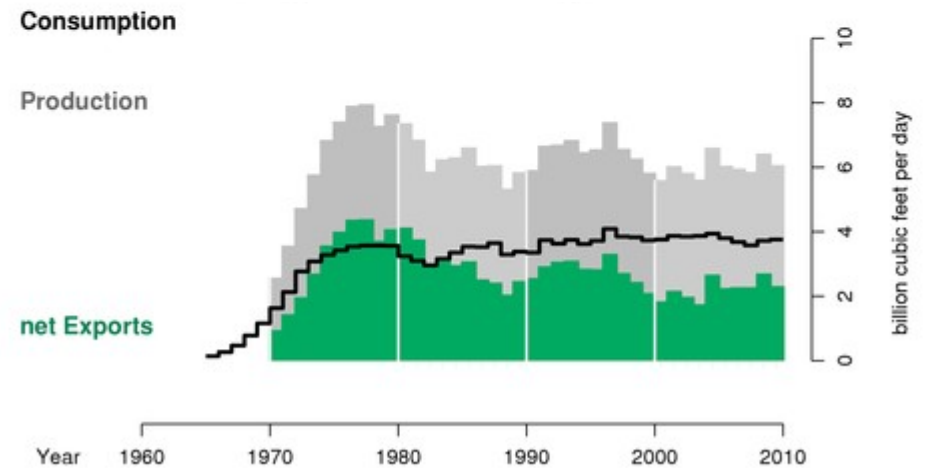
United Kingdom : Nat. Gas



Data: BP Statistical Review 2010 Graphic: mazamascience.com



Netherlands : Nat. Gas



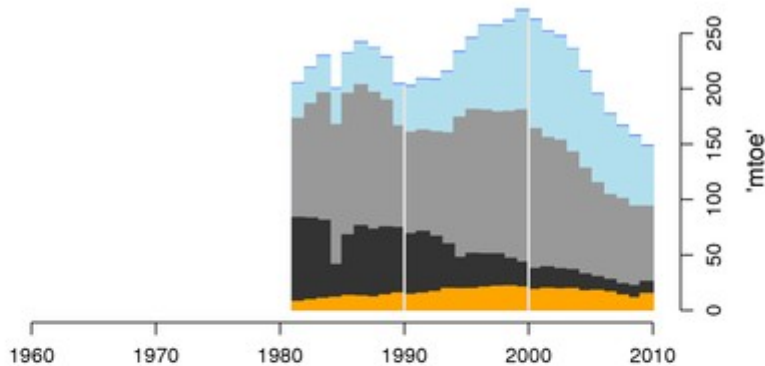
Data: BP Statistical Review 2010 Graphic: mazamascience.com

Same geology, different policies → different outcomes.

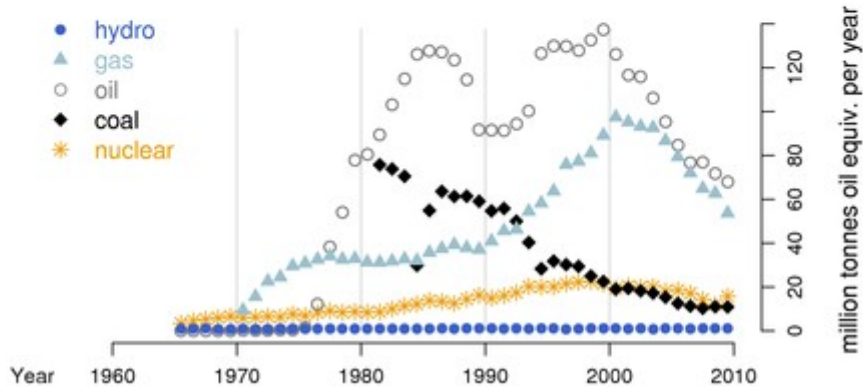
Primary Energy Production Trends.

Since 2000

2009 : Total energy produced decreased by 5.6 %



United Kingdom : Production



Data: BP Statistical Review 2010 Graphic: mazamascience.com

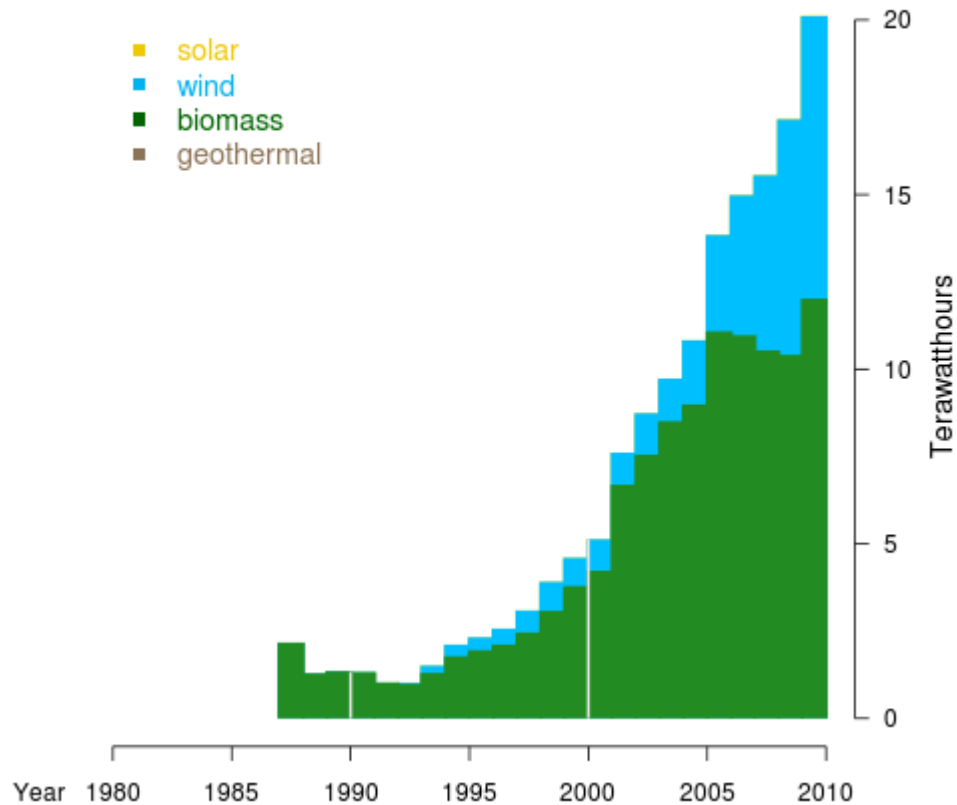
- Oil – down 46%
- Gas – down 45%
- Coal – down 43%
- Nuclear – down 19%
- Hydro – up 3% (whee!)

The UK needs new sources of energy NOW!

Electricity from non-hydro Renewables.

Since 2000

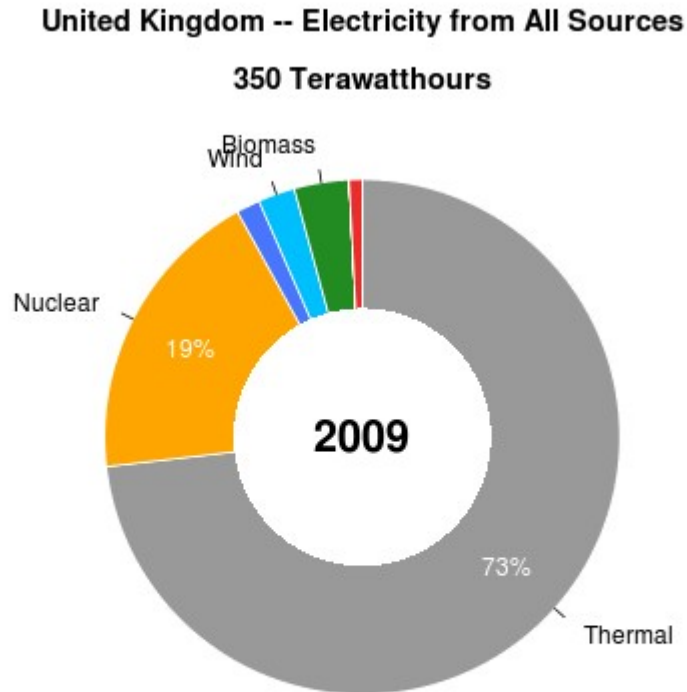
United Kingdom -- Electricity from non-hydro Renewables



- Biomass – up 185%
- Wind – up 800%

Renewables to the rescue!.

Electric Generation From All Sources.



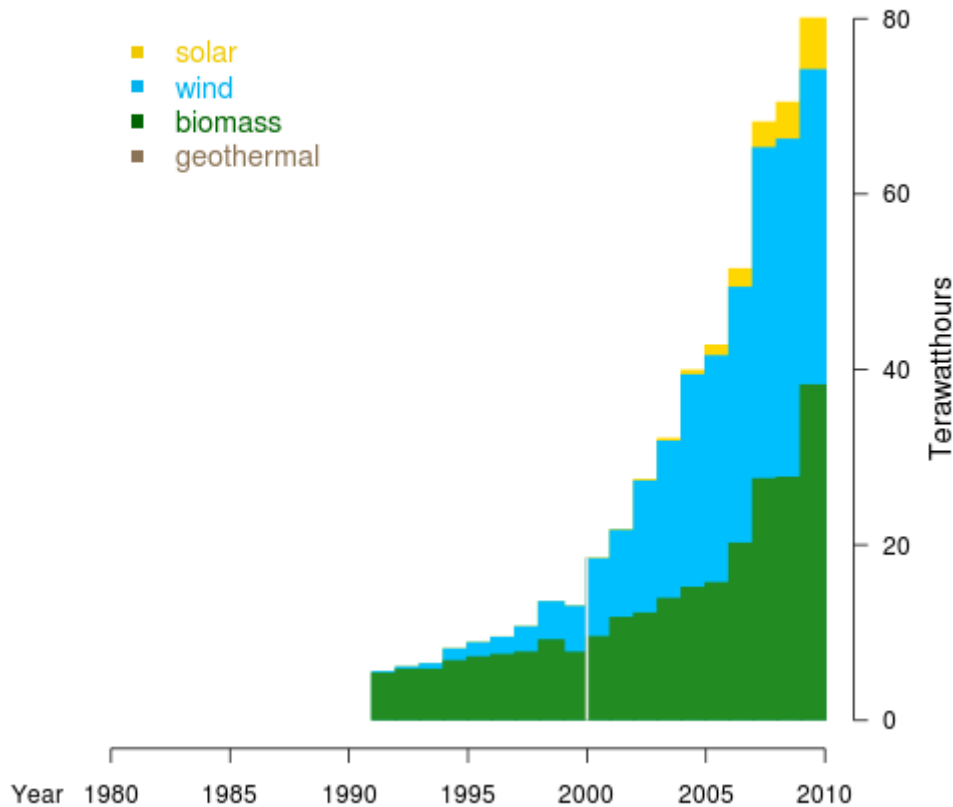
Data: EIA, Graphic: mazamascience.com

- UK nuclear is old.
- UK is now a gas importer.
- UK is now a coal importer.
- UK is an electricity importer.

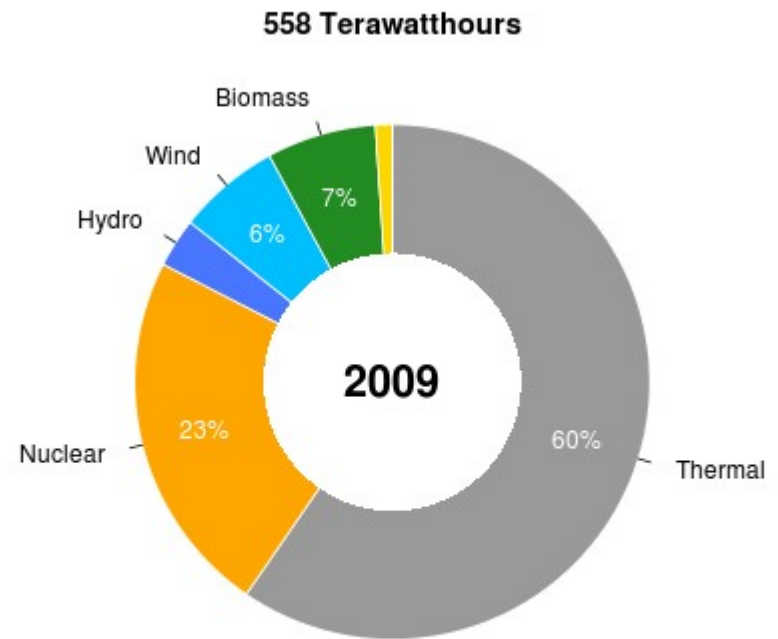
But they are a small fraction of total generation.

German Power Generation

Germany -- Electricity from non-hydro Renewables



Germany -- Electricity from All Sources

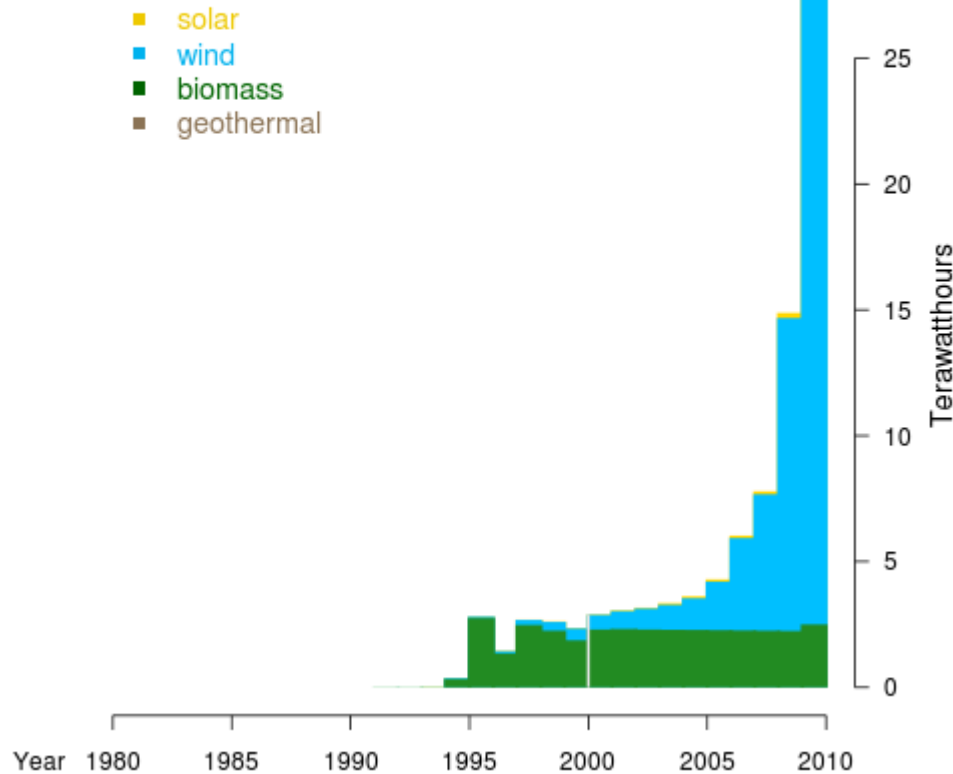


Data: EIA, Graphic: mazamascience.com

Germany is not much better off.

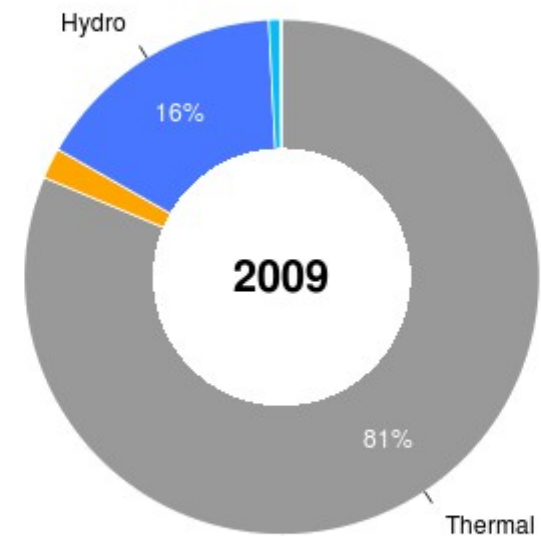
Chinese Power Generation

China -- Electricity from non-hydro Renewables



China -- Electricity from All Sources

3446 Terawatt-hours

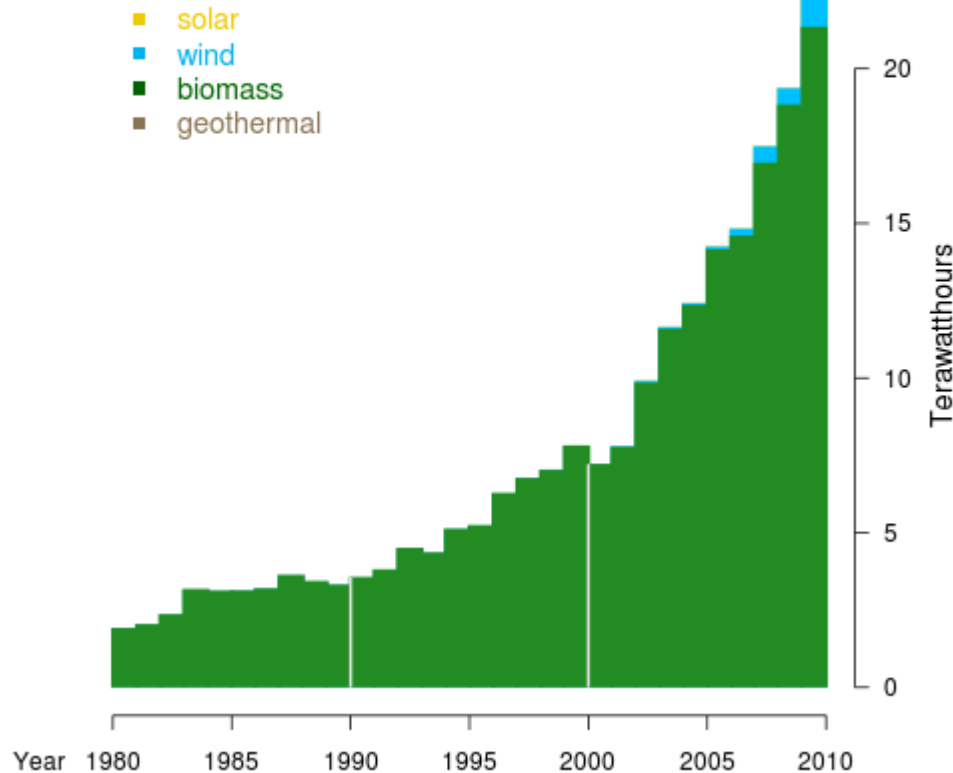


Data: EIA, Graphic: mazamascience.com

China currently burns a LOT of coal.

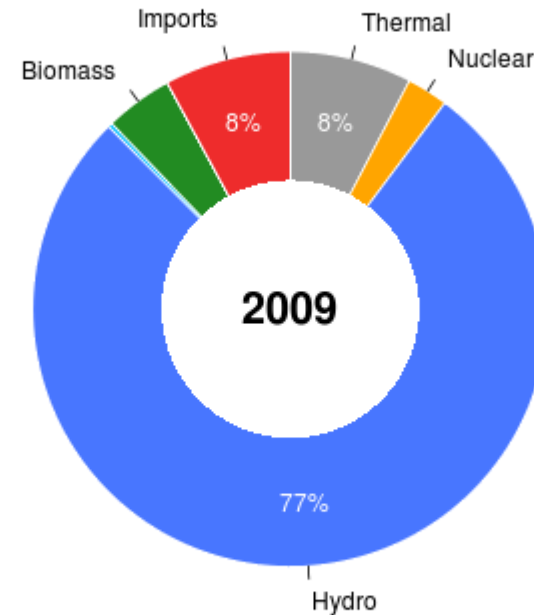
Brazilian Power Generation

Brazil -- Electricity from non-hydro Renewables



Brazil -- Electricity from All Sources

501 Terawatthours



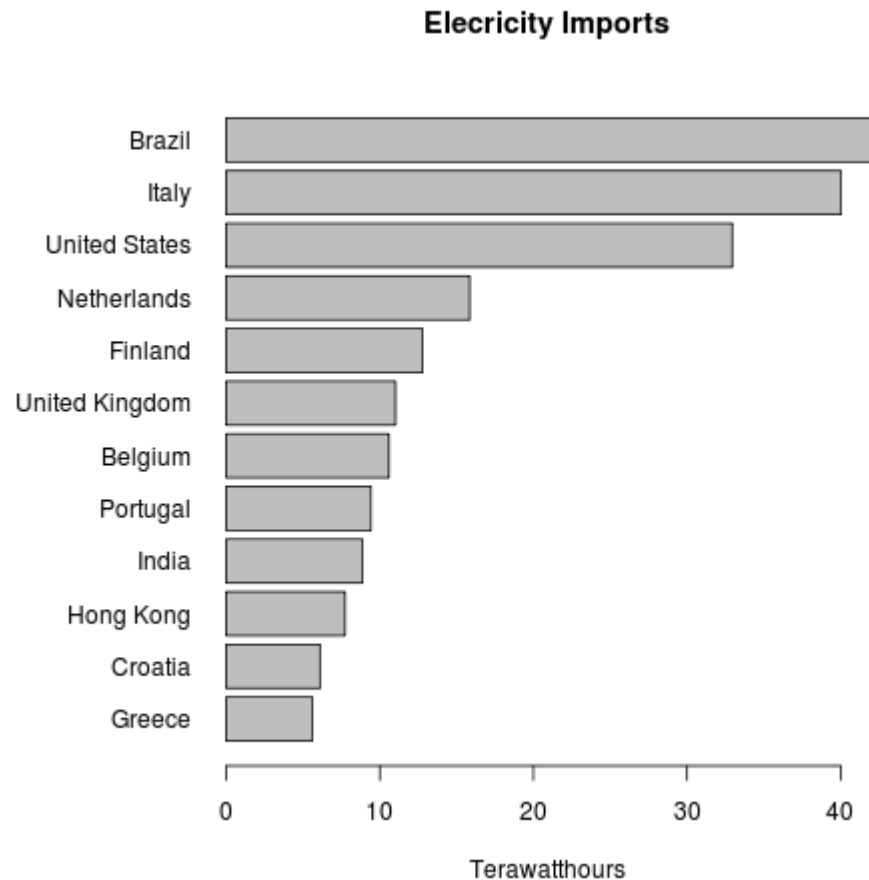
Data: EIA, Graphic: mazamascience.com

Brazil has massive hydro but is the #1 elec. importer.

Data Mining

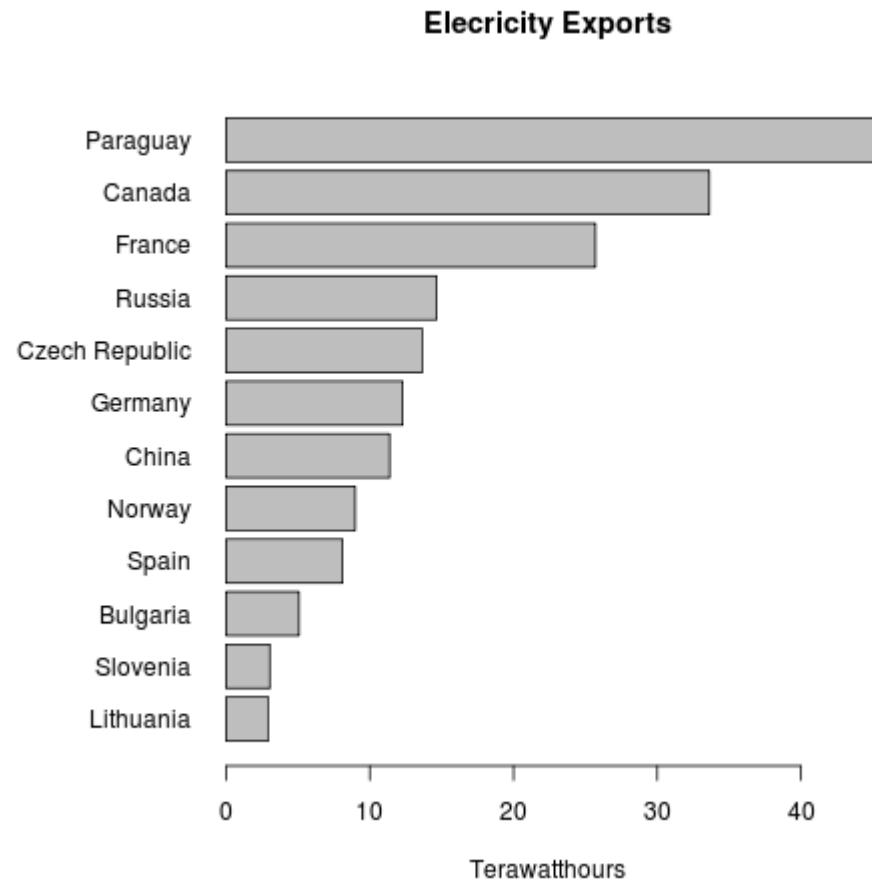
- With all this data we can also sort, filter, etc.
- We can get answers to very specific questions.
- The data may hold some surprises.

Electricity Importers



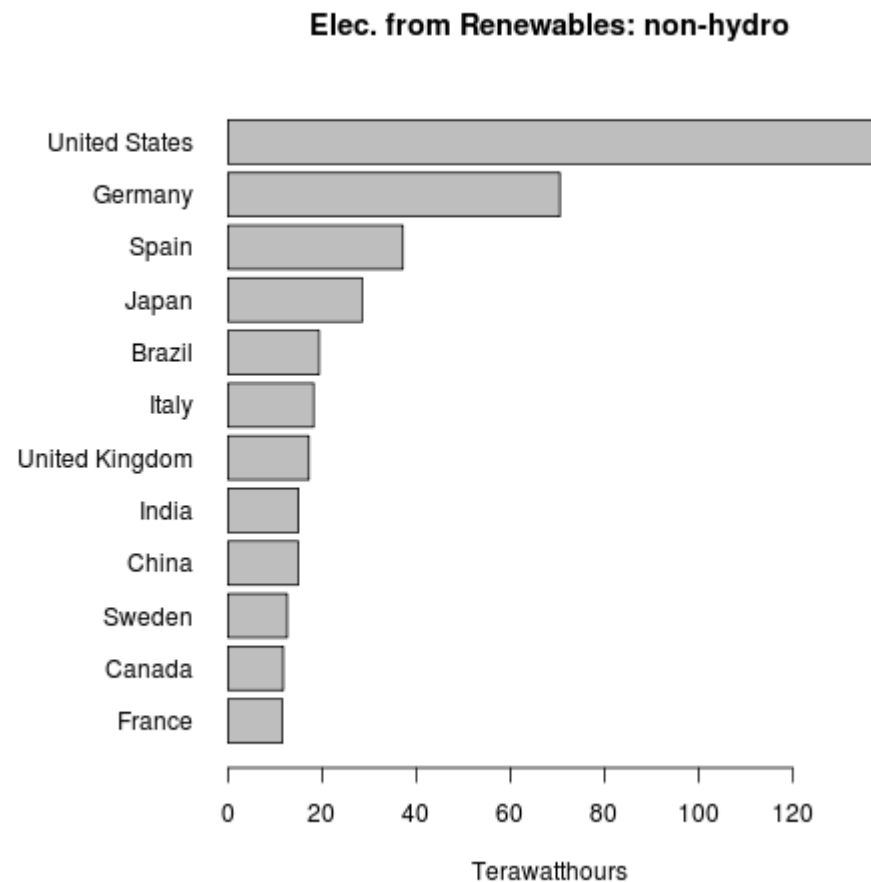
These countries need extra generating capacity.

Electricity Exporters



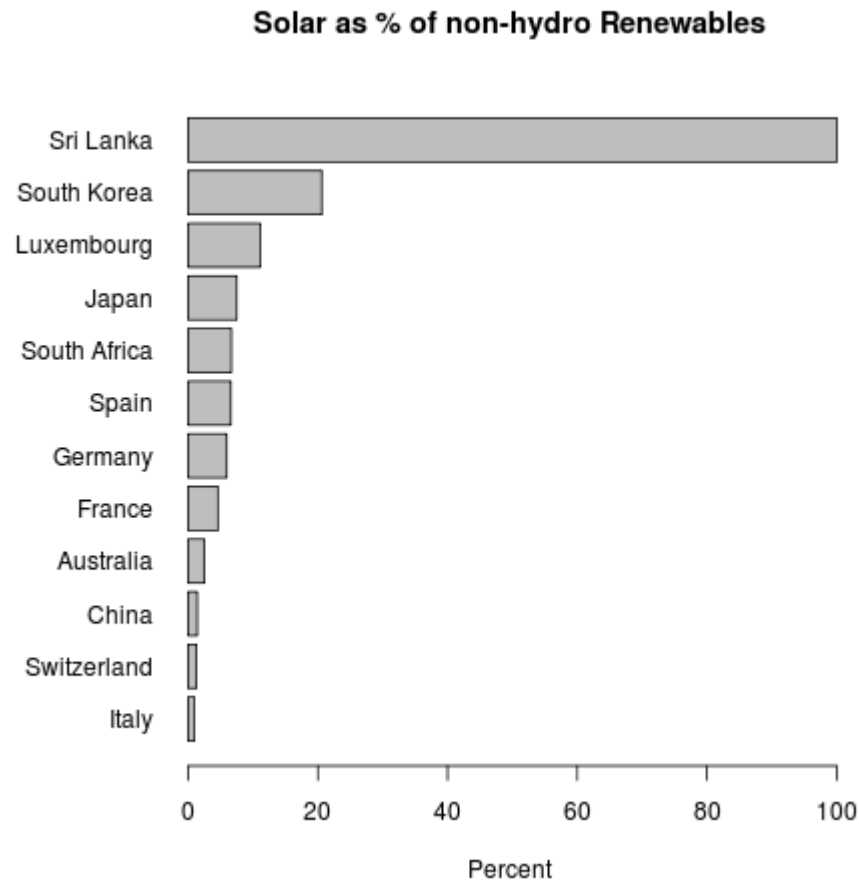
Some surprises in the list of exporters.

Electric Generation from non-hydro Renewables.



These countries are embracing renewables.

Solar as a % of non-hydro Renewables.



These countries are emphasizing solar.

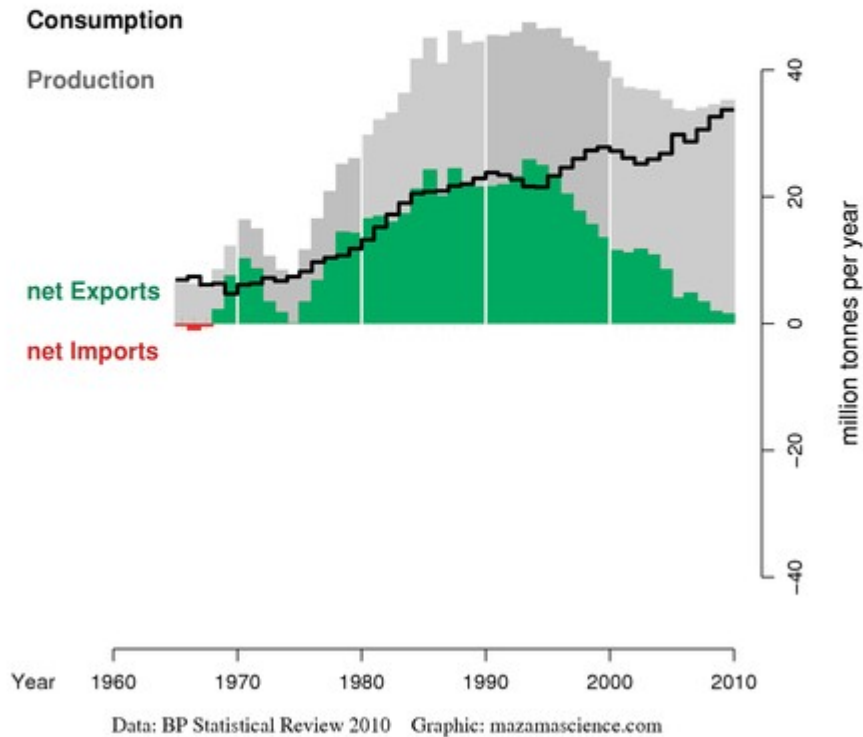
So Many Stories.

- Most developed nations are energy importers.
- Fossil fuel export volumes are peaking.
- Renewables are our only long term hope.
- Renewables are still in their infancy.

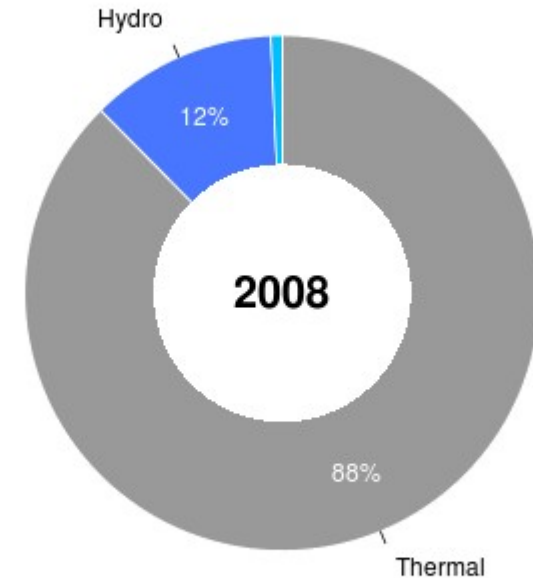
Egypt needs new sources of power.

Egypt : Oil

2009 exports decreased by 20. %



Egypt -- Electricity from All Sources 124 Terawatthours



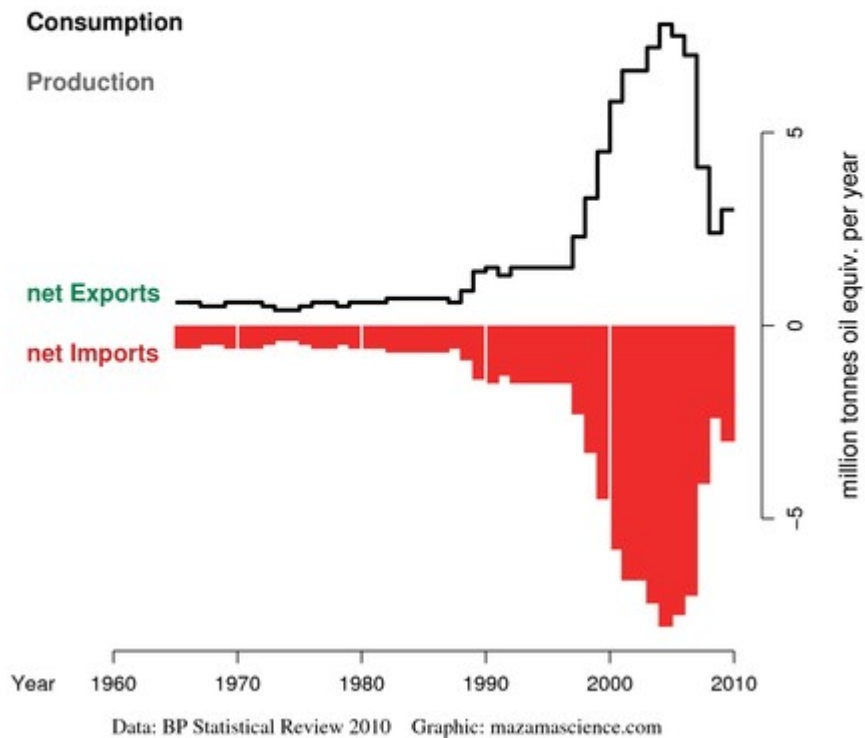
Data: EIA, Graphic: mazamascience.com

Egypt desperately needs solar power.

Chile needs new sources of power.

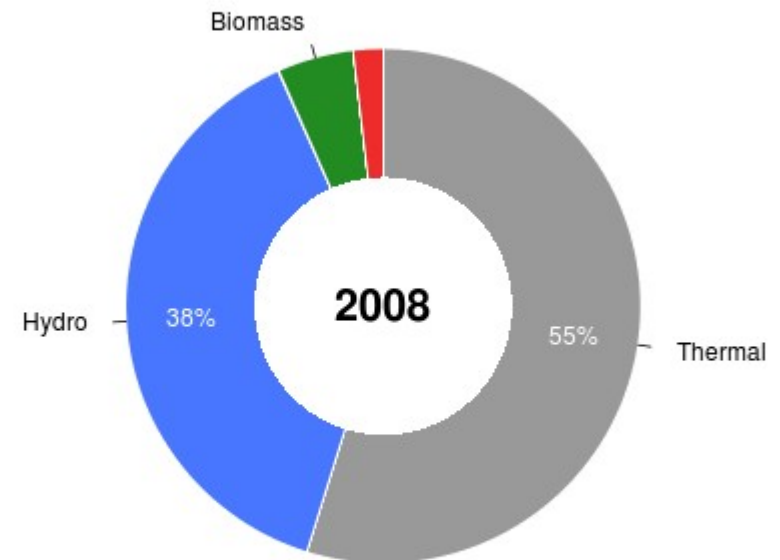
Chile : Nat. Gas

2009 imports increased by 25 %



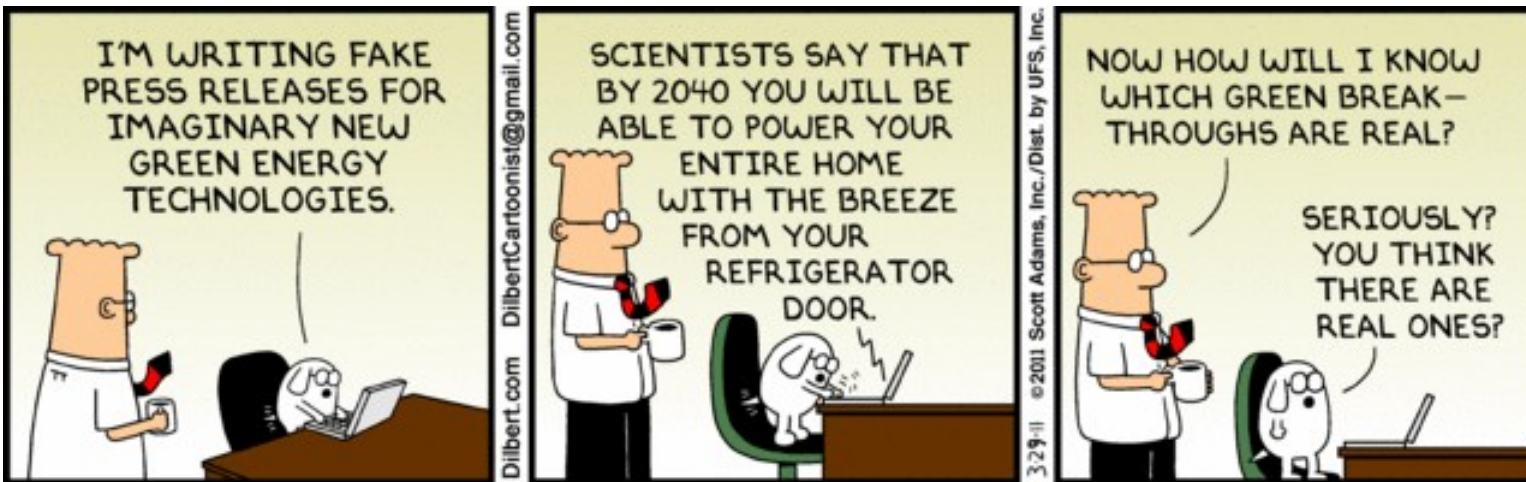
Chile -- Electricity from All Sources

61 Terawatthours



Chile has untapped wind and solar resources.

Take Home Message:



Show me the data!