

# Global Net Zero Resources Assessment



## Who are we?

We are a group of volunteers, working together, to make a global assessment of:

- a. fossil energy resources driving climate change;
- b. the renewable energy resources needed to substitute for fossil energy and meet new energy demand;
- c. the minerals needed to produce renewable energy technologies and the technologies to use this energy;
- d. the carbon sequestration potentials available to remove excess greenhouse gases from the atmosphere because we are going to overshoot our global emissions budget.

From this assessment, you will be able to see what resources your country has available to support our global transition to net zero emissions.

GloNZRA is an initiative made up of volunteers from the Tiaki Institute (New Zealand), Beat Cortex (Hungary) and the amazing Resource Management Young Members Group (RMYMG - international).

## Why GloNZRA?



Jeremy Webb  
Tiaki Institute | Programme lead

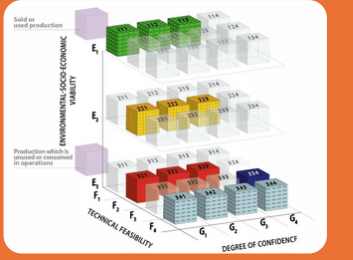
**Aim: Identify the resources we have available to support a global net zero transition**

The global net zero transition is going to need a lot of resources. Others have modelled the resources required, but no-one has compiled all the resources available... until now.

Only the United Nations Framework Classification is capable of classifying fossil, renewable, mineral and sequestration resources using the same classification. We use the UNFC to classify national resources estimates, so we can compare the resources available to support our global net zero transition.

By making national resource data comparable, we hope for increased interest by countries in the resources they have that are needed for a net zero transition.

We also hope countries consider using the UNFC to classify, and manage, their resource data, including fossil, renewable, mineral and sequestration data. The UNFC is a very useful tool for government decision making.



## Our initial results (still to be verified)

### Classical units

Energy resources	Production	Viable	Potential	Prospective	Units
<b>Fossil</b>					
Oil	4.5	244 (54 years)			Thousand million tonnes
Gas	4.1	188 (46 years)			Trillion cubic metres
Coal	9,095.6	107,4108 (118 years)			Million tonnes
Anthracite and bituminous		753,639			Million tonnes
Sub-bituminous and lignite		320,469			Million tonnes
<b>Renewable</b>	Quantity	Quantity (Period)	Quantity (Period)	Quantity (Period)	
Hydro	4,465,964	241,162,054 (54 years)			Million kilowatt hours
Solar	1,303,371	70,382,016 (54 years)			Million kilowatt hours
Wind	2,117,469	114,343,335 (54 years)			Million kilowatt hours
<b>Other resources</b>					
<b>Minerals</b>	Quantity	Quantity (Lifespan)	Quantity (Lifespan)	Quantity (Lifespan)	
Copper	21,550	1,000,600 (46 years)	2,100,000 (97 years)	3,500,000 (162 years)	Thousand tonnes
Lithium	198	26,028 (131 years)			Thousand tonnes
Nickel	3,807	144,870 (38 years)		350,200 (92 years)	Thousand tonnes
Manganese	20	1,908 (96 years)			Thousand tonnes
Cobalt	182	10,642 (58 years)			Thousand tonnes
Graphite	1,668	364,395 (218 years)			Thousand tonnes
Rare earths	354	115,602 (327 years)			Thousand tonnes
<b>Sequestration</b>					
Forests					Gigatonnes of CO2
Enhanced rock weathering					Gigatonnes of CO2

Sources: UNData, Energy Institute, IEA, USGS, Mudd and Jowitz 2022

These tables show proof of principle but may have errors. Next steps are improving data processes and quality.

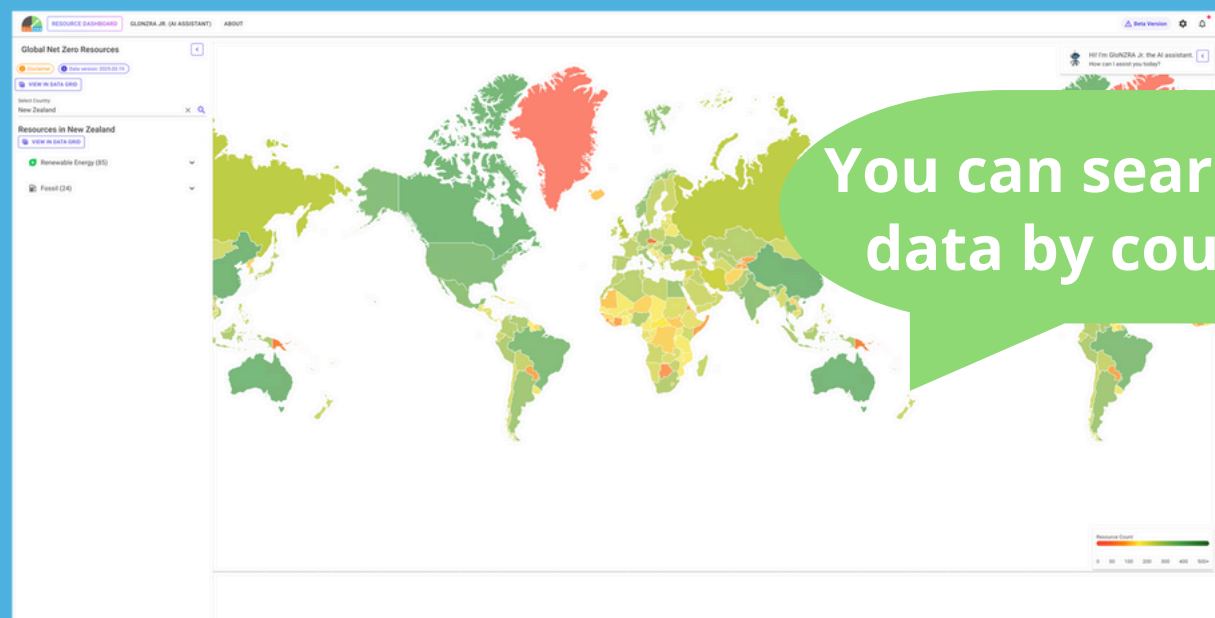
### Indicative tables (numbers will change)

Energy resources	Production	Viable	Potential	Prospective	Units
<b>Fossil (C additional global warming)</b>	Quantity	Quantity (Lifespan)	Quantity (Lifespan)	Quantity (Lifespan)	
Oil	0.006	0.33 (54 years)			Degrees Celsius additional global warming
Gas	0.004	0.17 (46 years)			
Coal	0.008	0.96 (118 years)			
<b>Total additional warming</b>	0.018	1.45 (82 years)			
<b>Renewable (million EVs)</b>	Quantity	Quantity (Period)	Quantity (Period)	Quantity (Period)	
Hydro	1,313	70,888 (54 years)	5,818,192 (54 years)		Million EVs (per year driving 18,000 km on average)
Solar	383	20,688 (54 years)	5,818,192 (54 years)		
Wind	622	33,611 (54 years)	5,093,444 (54 years)		
<b>Other resources</b>					
<b>Minerals (million EVs)</b>	Quantity	Quantity (Lifespan)	Quantity (Lifespan)	Quantity (Lifespan)	
Copper	405	18,808 (46 years)	39,474 (97 years)	65,789 (162 years)	Million EVs (able to be produced using these minerals)
Lithium	22	2,924 (131 years)			
Nickel	95	3,631 (38 years)		8,777 (92 years)	
Manganese	1	78 (96 years)			
Cobalt	14	800 (58 years)			
Graphite	25	5,496 (218 years)			
Rare earths	707	231,204 (327 years)			
<b>Sequestration (C less global warming)</b>					
Forests					Degrees Celsius reduced global warming
Enhanced rock weathering					

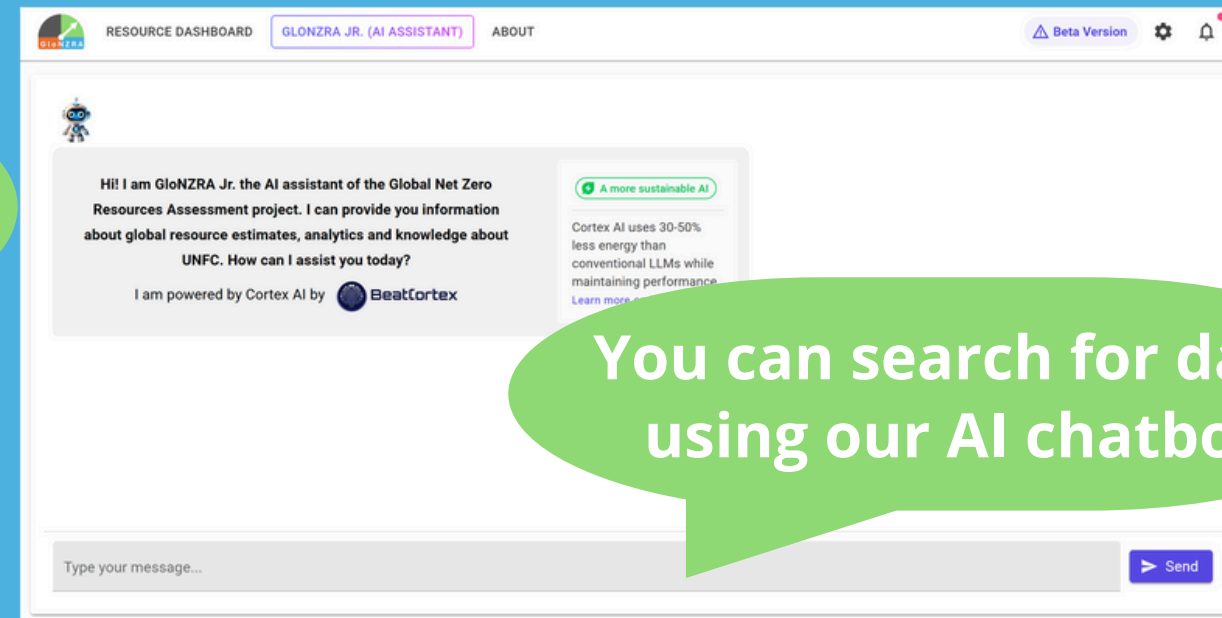
## Chat with GloNZRA Junior - and find country data using our AI chatbot



Milan Poczik  
Beat Cortex  
Technology lead



You can search for data by country



You can search for data using our AI chatbot



Test GloNZRA

## How did we collect and compile these data?

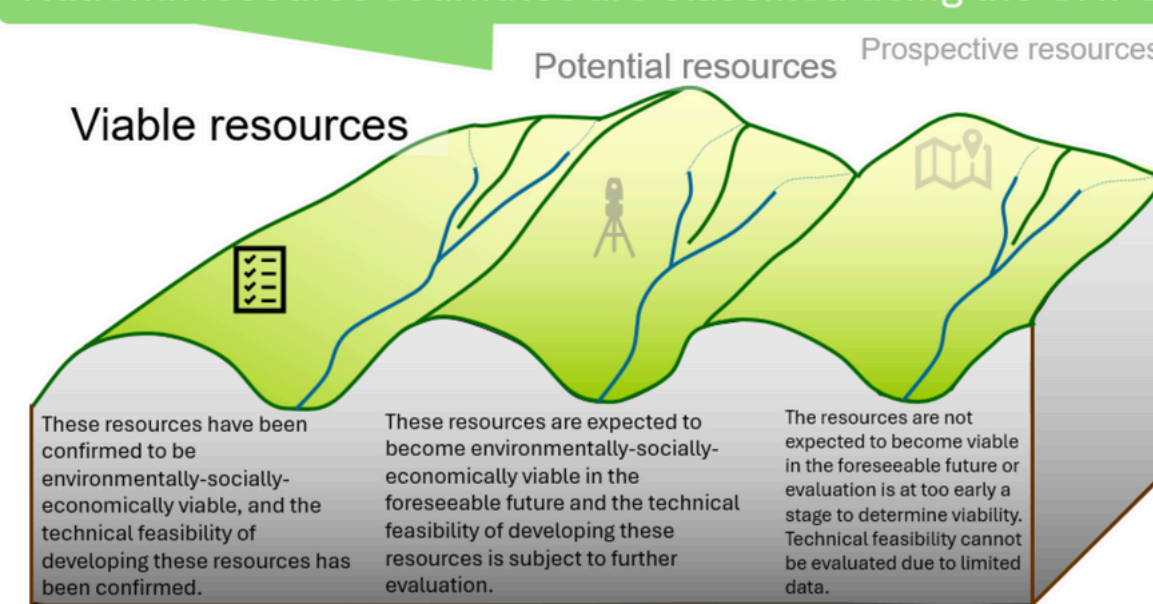
### Literature review

Members of Resource Management Young Members Group (RMYMG) have conducted a literature review, identifying datasets, documents and organisations that may have national level estimates of fossil, renewable, mineral and sequestration resources.

### Classification of resource estimates

Based on the metadata related to national resource estimates, resource estimates are classified as being viable resources, potential resources and prospective resources, based on the UNFC.

### National resource estimates are classified using the UNFC



### Data compilation

Fossil, renewable, mineral and sequestration resources estimates are organised into a GloNZRA database, using standard units such as energy and tonnes of minerals, as well as GloNZRA units.

GloNZRA units include additional global warming if fossil fuels are extracted and combusted, together with intuitive metrics such as the number of EVs that could be powered by renewable energy, made with the minerals resources identified, and the number EVs equivalent of carbon sequestration potentials.

## What have we learnt?

### RMYMG volunteers make a big difference

#### Applying the UNFC

GloNZRA has been a chance for our members to learn more about the UNFC and its application to all types of resources.

Bianca Neumann  
RMYMG Chair

### Source analysis - challenges finding data

#### Original Sources

Original sources are rare, and the same data are used by many publications.

Tien Nguyen  
RMYMG volunteer

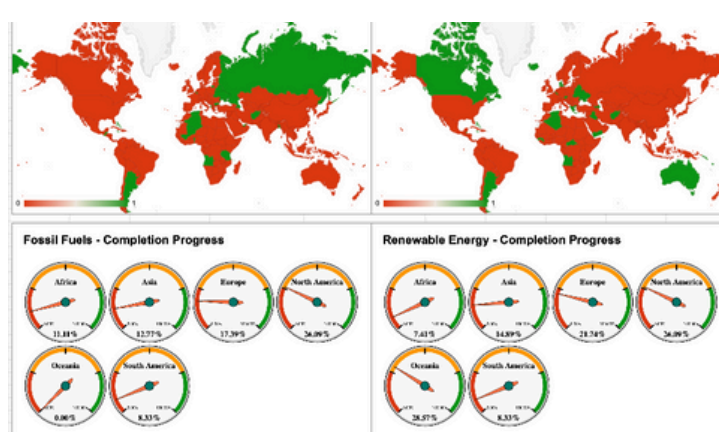
#### Mostly Covering Viable Resources

There is much more data available on viable resources, and very few national level assessments of potential and prospective resources.

### Data coverage tracking matrix & gauge chart

#### Data Coverage

Data coverage is uneven around the world, and varies by type of resource. We have the least amount of data for carbon sequestration potentials.



Charles Blais  
RMYMG volunteer

### The master table and initial results

#### Energy Institute Data

Data sources are changing over time, with increased coverage under the Energy Institute.

#### UNData

UNData is an excellent source of data, especially for renewable energy capacity and generation data.

#### Processing data

Data processing has proven very time consuming. This is only a pilot study, and in the coming months we will improve our systems and data quality.



Anna McKey  
Tiaki volunteer

### We need YOU!

If you can share data sources that could help, we would love to hear from you! We're interested in data on **viable**, **potential**, and **prospective** resources including fossil, renewable, mineral and carbon sequestration resources.

Your insights, suggestions, and feedback are also very welcome.

Scan the QR code to contact us, or directly email our project lead Jeremy Webb: jeremy.webb.15@alumni.ucl.ac.uk

Also, watch out for publication in October!

### Online:

LinkedIn: <https://www.linkedin.com/showcase/global-net-zero-resources-assessment/>

Website: <https://glonzra.com>

### GloNZRA partnership:

**Tiaki Institute**  
People | Planet | Prosperity

**BeatCortex**  
Data specialists

**RMYMG (UNECE)**  
Resources Management  
Young Members Group