



POWER

POWER:

Empowerment of Youth on Renewable Energy for Sustainable Societies

## Poster Exhibition

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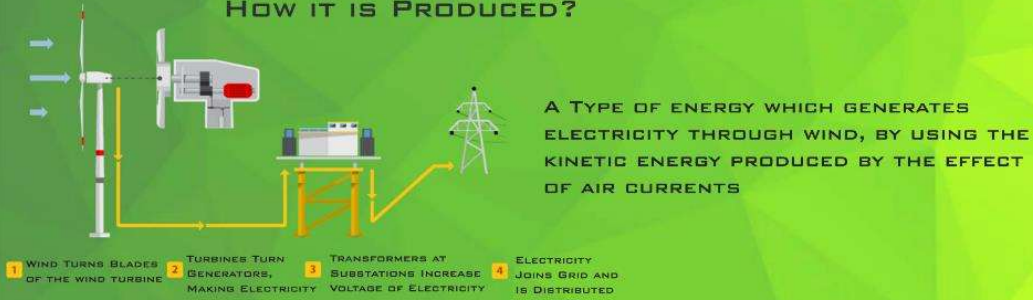
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## SERIAL KILLER: WIND TURBINES

WHAT IS WIND ENERGY AND  
HOW IT IS PRODUCED?



### DANGER :

BIRDS DIE DUE TO SETTING TURBINES ON THEIR MIGRATION ROUTES. BETWEEN 140.000 AND 328.000 BIRDS DIE EVERY YEAR FROM COLLISIONS WITH WIND TURBINES

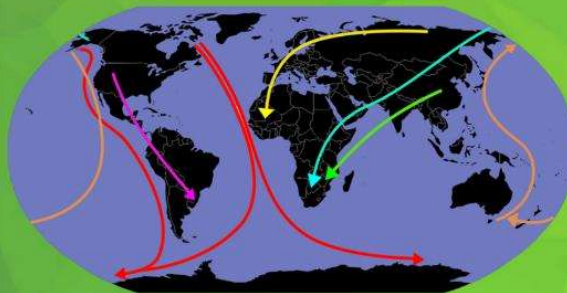
NEWER TURBINES CAN BE DESIGNED WITHOUT LATTICE FRAMES AND WITH VERTICAL AXIS-ROTORS. IT HAS A POSSIBILITY OF REDUCING DEATH RATES BY 50%.



WINDFARMS CAN BE LOCATED AWAY FROM MAJOR MIGRATION ROUTES WITH CLOSER EXAMINATION OF THEM.



## URBANIZATION EFFECT



*Oenanthe oenanthe* Northern Wheatear  
*Sterna paradisaea* Arctic Tern  
*Falco amurensis* Amur Falcon  
*Puffinus tenuirostris* Short-tailed Shearwater  
*Philomachus pugnax* Ruff  
*Buteo swainsoni* Swainson's Hawk

MANY RECENT STUDIES HAVE SHOWN THAT ARRIVAL TIMING IS RELATED TO TEMPERATURES EN-ROUTE AND AT DESTINATION. BECAUSE URBAN AREAS ARE "HEAT ISLANDS", WITH HIGHER TEMPERATURES THAT INFLUENCE EARLIER VEGETATION AND INVERTEBRATE DEVELOPMENT, THIS SHOULD FAVOUR EARLIER ARRIVAL OF MIGRANT BIRDS TO CITIES RATHER THAN TO RURAL AREAS.

DENİZ YILMAZ  
21401489

## SHOP WITH FABRIC, STOP EATING PLASTIC

### WHY SHOULD YOU SAY GOODBYE TO PLASTIC BAGS?

- One plastic bag is used only for 12 minutes, but it takes more than 500 years for a single plastic bag to degrade.
- Except, they don't entirely degrade but turn into microplastic.
- The microplastics in the oceans are now in our **salt**, our food.
- Annually, we pollute the oceans with 81 billion kg of plastic.
- 100,000 marine animals are killed by plastic bags every year.
- 1.6 billion liters of oil is used to make 100 billion plastic bags.
- It only takes 14 plastic bags to drive your car for 1.6 km.
- 8% of the world's oil is used in the production of plastics.
- If Turkey banned plastic bags, theoretically, 4.5 billion MJ energy could be saved, greenhouse emissions could be reduced by 395 ton and solid waste by 16 million kg.
- The USA spends 4 billion dollars annually for plastic bags.
- California spends 25 million dollars to clean plastic bags.
- Thousands of dollars are spent on landfill plastic strategies.

### WHICH MATERIAL IS BETTER AS AN ALTERNATIVE?

MATERIAL / WASTE	ENERGY CONSUMPTION	GREENHOUSE EMISSION	LITTER	WATER USAGE
SINGLE-USE PLASTIC BAG	⚡⚡	☹️☹️☹️	🗑️	💧💧
BOUTIQUE PLASTIC BAG	⚡⚡⚡⚡⚡	☹️☹️☹️☹️☹️	🗑️🗑️🗑️	💧
PAPER BAG	⚡⚡⚡⚡⚡	☹️☹️☹️	🗑️🗑️🗑️	💧
REUSABLE COTTON BAG	⚡	☹️	🗑️	💧💧💧

### MAKE YOUR OWN CUSTOM, REUSABLE, ECO-FRIENDLY GROCERY BAG:

#### 1. GET AN OLD T-SHIRT



- Just make sure that it's cotton!
- The bigger the t-shirt, the bigger the bag!

#### 2. START CUTTING!



- Cut the sleeves, collar and the bottom of the t-shirt.
- You don't have to be precise!

#### 3. CUT SMALL STRINGS ON THE BOTTOM



- Cut the bottom of the t-shirt into approximately 2x6 cm parts (no precision necessary!).

#### 4. TIE THE STRINGS TOGETHER



- Double-knot the front pieces to their back pieces one by one.
- Cut fringes for a cleaner look.

#### 5. TIE THE EXTRA PIECE



- Take the part you took off from the bottom, loop it in the armholes, tie it and wrap each tail around!

#### 6. DECORATE IT AS YOU WISH!



- Don't like fringe? Turn it inside out!
- Customize your one of a kind, washable, reusable grocery bag!

Büsrâ Yücel 21502645



## NUCLEAR ENERGY

Can it be Turkey's Resource?

### What is Nuclear Power?

Nuclear technology uses the energy released by splitting the atoms of certain elements. It was first developed in the 1940s, and during the Second World War research initially focused on producing bombs. In the 1950s attention turned to the peaceful uses of nuclear fission, controlling it for power generation.

### Nuclear Energy in Turkey

On the map, planned nuclear power plants till 2023 are shown.

**Planned Nuclear Power Plants in Turkey**

Signs symbolize:  
- the status of power plants (on progress or delayed)  
- countries that Turkey have an agreement with  
- construction order.

Source: World Nuclear Association  
Plans for nuclear power are a key aspect of the country's aim for economic growth, and it aims to cut back its vulnerable reliance on Russian and Iranian gas for electricity.

### The importance of Nuclear Power in the World

Shows the place of nuclear energy among the other energy sources for producing electricity.

Sixteen countries depend on nuclear power for at least one-quarter of their electricity.

### Comparison of Wind and Nuclear Power

**2077 2-Megawatt Wind Generators:**  
0,068,136 Megawatt Hours of electricity per year.  
80% electricity from constant supply, 20% for peaking operations.

**One 1154-Megawatt Nuclear Power Plant:**  
0,068,136 Megawatt Hours of electricity per year.  
80% electricity from constant supply, 20% for peaking operations.

2077 Wind Generators = 1 Nuclear Power Plant

Cagla SOZER  
21401410

powered by  
**PIKTOCHART**

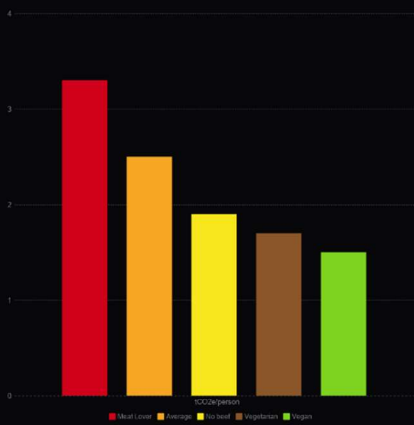
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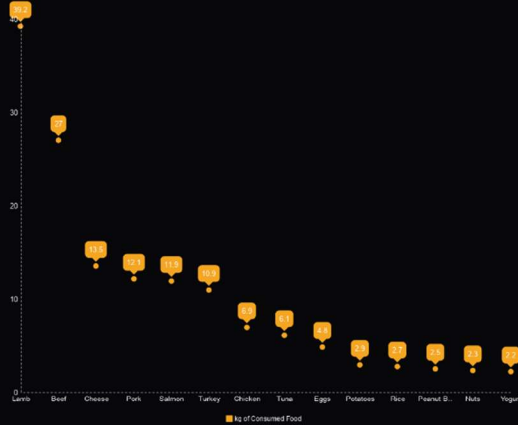
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# CLIMATE CHANGE IS ON OUR PLATE

Footprints by diet type



Greenhouse Gas Emissions from Proteins and Vegetables



## DEFORESTATION



The Amazon stores roughly 120 billions of tons of carbon. Forests are a crucial carbon stock: forest ecosystems globally store about one-and-a-half times as much carbon as is present in the atmosphere. They act as a brake on further acceleration of climate change.

## GHG EMISSIONS



Around 18% of global emissions of greenhouse gas are related to meat consumption worldwide. A beef calf produces five tones of CO<sub>2</sub> – equivalent throughout its life cycle.

## FARTING COWS



Belched methane from livestock, plus methane from manure make up 37 % of global methane emissions. Methane is 20 times as damaging to the climate as CO<sub>2</sub>.



Pursuing a vegan diet will reduce one's CO<sub>2</sub> footprint more than half compared to a meat lover.

SOURCES:  
Meat Eater's Guide by Environmental Working Group  
Amazon Cattle Footprint by Greenpeace

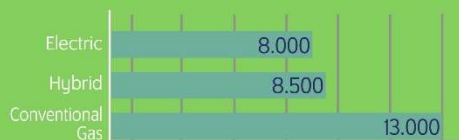
Prepared by Ezgi Altınöz

# RISE OF ELECTRIC AND HYBRID CARS IN TURKEY

## Reasons To Disseminate Electric and Hybrid Cars

- 1 Reduced fuel costs (electric vehicle costs more than 6 times of gas vehicle)
- 2 Less pollution due to fewer emissions, way of a greener future
- 3 Especially electric cars require less maintenance, eliminates maintenance cost
- 4 Instant torque
- 5 No idling
- 6 Higher resale value
- 7 Electric cars are safer than gasoline cars because they do not catch fire in accidents

## Annual Emission of Conventional Gas is Quite High in Comparison



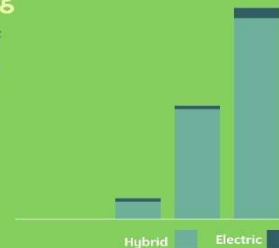
## Compared to Gasoline Cars Lifetime Consumption and Fuel Costs of Hybrid and Electric Cars are Quite Low



Reference: TEHAD- Turkey Electric& Hybrid Cars Association

## Sales of Hybrid & Electric Cars are Increasing

Increase in total sales of hybrid and electric cars is almost %370. Market share and availability are rising rapidly.

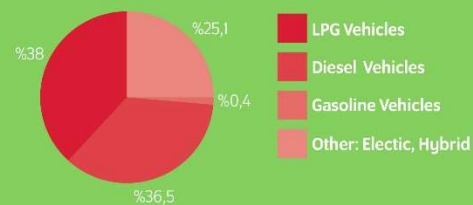


## Electric Car Sales in Turkey are Changing Rapidly

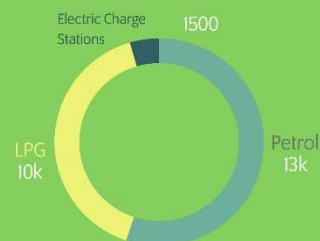
It is visible that tendency to electric cars increases by years. Usages of alternative fuel sources in cars – such as electric – are not that common in Turkey, but it has progress potential.



## Ratio of Electric Cars are Still Extremely Low in Turkey



## Fuel Stations of Electric Cars Reached To A Convenient Level

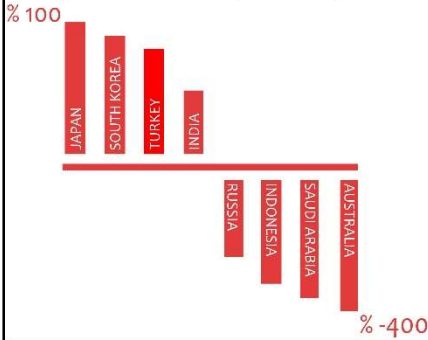


FEYZA YILMAZ



# GEO THERMIE IS SUPER-HOT AND AS BEAUTIFUL AS EVER!

Turkey mostly meets her needs by importing oil and gas. The use of geothermal energy can easily reduce this dependency on non-renewables for, especially, electricity and heating.



## FREE TURKEY FROM THE FOREIGN FOSSIL FUELS

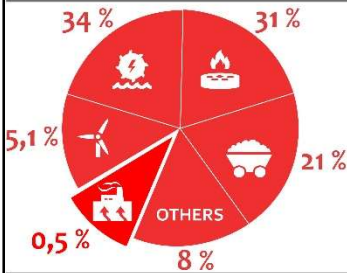
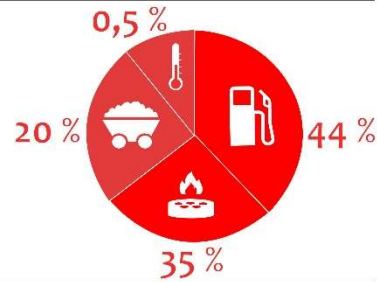
Energy dependency means to what extent a country's economy is dependent on the imports so as to satisfy its needs. The graph shows the top 4 and bottom 4 countries in terms of EG.

Source: Eurostat

## ITS RUSSIA'S OIL AND IRAN'S GAS

The pie chart shows the percentages of Turkey's imports annually. Oil and gas is imported most.

Source: Eurostat



## DON'T BE FUELISH

The pie chart demonstrate the percentages of energy production for electricity and heating. Geothermal energy is the least one used although Turkey is ranked 8th with 635 MWe installed capacity for Selectricity and heating in the world.

Source: Eurostat

## WITH LOVE FROM MOTHER EARTH

The table on the right hand side describes the major areas of usage regarding geothermal energy and some of the distinct heat in cantigrade degree.


Source: Eurostat

Heat	Area of Usage
20 °C	fish farms
40 °C	soil heating
60 °C	heating for greenhouse and livestock industry
80 °C	heating for urban and rural areas
100 °C	blighting organic metaterials such as vegetables and canning
120 °C	heating for fresh/potable water
140 °C	sugar and salt industry
160 °C	lumber industry
180 °C	power generation-electricity


Credits: M. Mert Orsler



# CARBON CAPTURE STORAGE



Greenhouse gas emissions resulting from the use of fossil fuels to generate energy mostly cause the carbon and carbon dioxide gases to be released into the atmosphere and this leads to global warming and climate change.




According to researches, greenhouse gas emissions increased dramatically over the years.

Many scientists share the same view that the CO<sub>2</sub> emissions in the world should be reduced by at least 50% compared to today.

According to the reports of the International Energy Agency, Carbon Capture Storage (CCS) has the potential to contribute 14% to global carbon emission reduction based in 2060.

With this rate, CCS is the third critical factor behind Energy Efficiency (40%) and Renewable Energy (35%).





**CCS system, captures CO<sub>2</sub> from electricity generation and industrial production and is liquefied with high pressure and stored between special impermeable layers of the ground.**

With the CCS system, liquefied CO<sub>2</sub> can be used to improving the production efficiency in oil wells and increasing the production efficiency in natural gas wells.

**Carbon Capture Storage is generally used by well-developed countries. According to GCCCI 2018, there are:**

<b>U.S: 36</b>	<b>Australia:7</b>
<b>Europe:32</b>	<b>Other: 17(Arab Amirates, Brazil etc.)</b>
<b>Canada:10</b>	
<b>China:19</b>	

**CCS facilities, which are large-scale or small-scale.**

**REC(Regional Environment Center) Turkey's scientific research in 2018 about CCS claims that, %46 of public and private sector employees, academicians, and experts think "CCS could not be used in short-medium term in Turkey". Another research shows us, only %51 of these people know the system of the CCS.**

%64	YES
%46	NO

**%65 of the people suggest that, " CCS could be the first method to decrease the carbon emissions and prevent the global warming." %35 of the people states the other systems and methods such as, renewable energy resources should be the first choice to use.**

%65	YES
%35	NO

# URBANIZED CITY THROUGH RAINFALL : HOW DOES CLIMATE CHANGE RELATE TO IT?

WITHIN THE SCOPE OF RURAL VS URBAN

## ISTANBUL :

**209**  
Skyscrapers

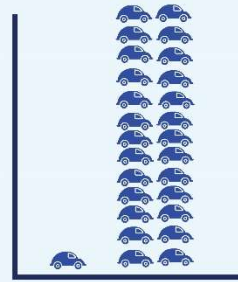


**5,165**  
High-Rise Buildings



High rise buildings are considered as taller than 50 meter and skyscrapers are considered as taller than 100 meter. Number of skyscrapers and high-rise buildings numbers can be regarded as a huge reason for urbanization due to its feature of reflecting the light and increase the temperature in the region, therefore it changes the climate. (Source: Emporis)

## NUMBER OF CARS



One car represents 150,000 cars. Greenhouse gas emission is one of biggest reason for climate change in terms of carbon emission. (Source: Turkstat)

## RURAL CITY: EDIRNE



## URBAN CITY: ISTANBUL



Rain Scale: Ground ■ 9-9 mm ■ 10-10mm ■ 11-13mm ■ 14-17mm ■

Both Istanbul and Edirne has placed in the same region which is Marmara and have same climate. This rain map demonstrates Istanbul's and Edirne's rain situation in 2017 in 5 minutes period. The situation shows that although Istanbul has maximum amount of rainfall when comparing with the Turkey's other cities, Edirne has not so much excessive raining. (Source: General Directorate of Meteorology of Turkey)

## POPULATION

### EDIRNE



### ISTANBUL



The mosque is the symbol of Edirne. One person represents 400,000 people. The reason of the climate change in urbanized cities are the number of people that live in this place as well since when the number of people live in a city increase, the consumption of electricity and resources increase. (Source: Turkstat)

Nursan Akıncı



## CAN PLUG-IN ELECTRICAL VEHICLES COMPLETELY ELECTRIFY DEVELOPED REGIONS IN THE WORLD?

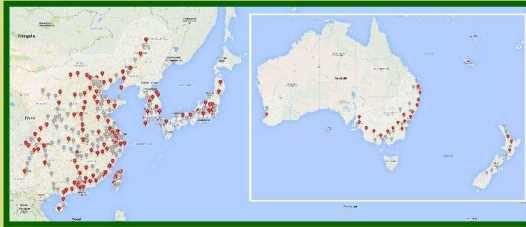


### Outstanding Environmentalist features of Plug-in Electric Cars:

1. Emits no tailpipe emissions.
2. Production of their batteries does not have environmental impact. These batteries contains lithium and there is an abundance of lithium reserves. We have sufficient reserves until 2050. Also, most of these batteries are recyclable.

### ELECTRICAL VEHICLE CHARGING STATION MAPS OF DEVELOPED REGIONS

ASIA = 1,130 Supercharger Stations with 8,496 Superchargers



WESTERN EUROPE = 1,130 Supercharger Stations with 8,496 Superchargers



USA = 1,130 Supercharger Stations with 8,496 Superchargers



TURKEY = 1500 Electric Charge Stations / 13,000 Petrol Stations/ 10,000 LPG Stations/ 9 Superchargers



- Developed countries has increased number of public charging stations. This shows that developed countries like USA, China, Australia and Western European countries feel responsible for air pollution and they are really trying hard to stop air pollution.

- Turkey is a developing country and industry is developing fast. Turkey needs to take some steps about electric vehicles and supercharger stations.

- East of Turkey lacks charging stations.

- Sales of electrical cars still are not so high because national income and level of welfare is not sufficient to purchase them.

- Actually, Turkey should make use of EVs because Turkey is rich in renewable energy resources.

- In some electrical car models, they have an interrelated navigation; Whenever car runs out of energy, it goes closest charging station.

- Although this technology has many benefits, all societies including Turkish society is still unaware of it.

#### DATA REFERENCES

- Farhan, Mohd. Marketing of Electric Cars. Berlin: Technische Universität Berlin, 2016. Print p. 30-54

- "PlugShare - Find Electric Vehicle Charging Locations Near You" [www.plugshare.com/](http://www.plugshare.com/).

- "Supercharger | Tesla." Tesla, Inc. [www.tesla.com/supercharger](http://www.tesla.com/supercharger).

- "Electrical Vehicle Survey Methodology and Assumptions." 2016.

Onurcan Boran



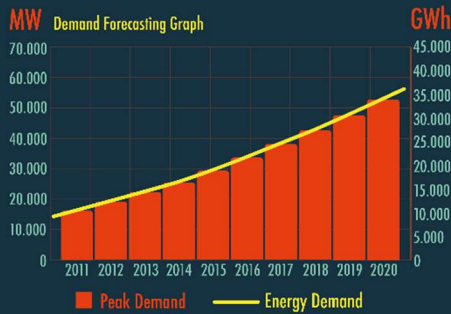
# POWER GENERATION OF TURKEY

## An Analysis on Guesses and Facts

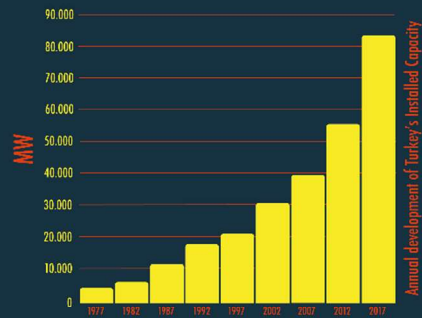


**GDP OF TURKEY**  
**851 BILLIONS \$**

MONEY MOSTLY COMES FROM FOREIGN BANKS WITH FOREIGN CURRENCY



102,5 BILLIONS \$- INTEREST PAYMENT OF TURKEY (2018)



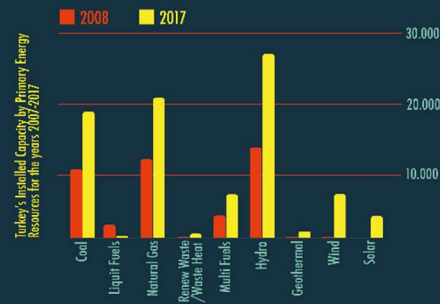
Only in 2017, 1583 energy plants was opened that have 6089 MW installed capacity with investing around 6,2 billion \$

Peak Power and Energy Consumption in Turkish Electrical Systems Between 2008-2017

Turkey has no need to build new energy plants instantly, forecasts mostly wrong!

YEARS	ELECTRICITY CONSUMPTION	PROJECTIONS																		
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013									
2000	130																			
2005	168,8	168,5																		
2006	174,6	174,4																		
2007	181	193,7																		
2008	180,1	206,4	204,0																	
2009	180,1	223,5	219,5																	
2010	218,4	242,0	236,2	218,4																
2011	238,3	262,0	257,8	214,5																
2012	242,4	283,5	272,8	255,9	244,8															
2013	246,4	306,1	295,6	283,5	262,8	255,5														
2014	257,2	330,2	315,1	272,7	281,8	271,8	256,7													
2015	267	356,9	339,1	282,1	291	282,9	271,5	261,3												
2016	278,3	383,7	364,5	302,7	302,7	302,7	287,5	284,6	278,5											
2017	288,8	410,2	388,1	318,2	318,2	318,2	302,7	291,2	283,3	284,6										

Projections Of Forecasted Demand and Real Demand in Consumption of Electrical Energy (Billion kWh)



$$\%55,93 = \frac{\text{MAXIMUM PEAK DEMAND}}{\text{CAPACITY}}$$

### References

TEIAS - Turkish Electricity Transmission Corporation  
Ministry of Energy and Natural Resources

Orhun Ege CANSARAN

# BIOFUEL

## REDUCES GREENHOUSE GAS EMISSIONS

According to the United States Department of Agriculture, starch-based biofuel reduces greenhouse gas emissions by 43 percent compared to conventional gasoline, would further reduce greenhouse gas emissions by 50 percent by 2022 and has the potential to reduce emissions by as much as 76 percent. Cellulosic biofuel has a greenhouse gas reduction of 85-95 percent over 2005 gasoline baseline.

Fuel Type	GHG Emissions (gCO <sub>2</sub> e/MJBTU)	Reduction
TRADITIONAL GASOLINE	98.2	-
STARCH-BASED BIOFUEL	56.0	+43%
CELLULOSIC BIOFUEL	14.7 - 4.9	+85-95%

### Biodiesel consist of;

- SOYBEAN OIL %52
- CANOLA OIL %8
- CORN OIL %11
- USED OIL %13
- ANIMAL FATS %14
- OTHER %2

More than 80 percent of biodiesel is made from vegetable oil (the rest is mostly animal fats). The soybean and canola oil that make up the majority of biodiesel is basically the same as the cooking oil you buy at the grocery store, while the corn and used cooking oils are inedible varieties generally used for animal feed and other purposes.

### Carbon pollution table

Fuel	Carbon Pollution (g/MJ)
gasoline	100
diesel	100
BioFuel	18
landfill gas	28
electricity	30

### From Biomass to Advanced Biofuels and Bioproducts

**Sustainability**  
Produce biomass for biofuels and bioproducts with minimal to positive impacts on the environment.

**Biomass Development**  
Develop crops with cell walls optimized for deconstruction and conversion to biofuels and bioproducts.

**Biomass Breakdown**  
Improve enzymes and microbes that break down biomass into sugars and lignin.

**Biofuel and Bioproduct Synthesis**  
Engineer metabolic pathways in microbes to produce biofuels and bioproducts.

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## THE RENEWABLE ENERGY MAP OF TURKEY

**HOW TO PLAY ?**

- It can be played with 2 or 3 people.
- Roll the dice and move your game piece according to the number.
- Check out the guidance what you have on your number.
- Perform what the number says on the guidance.
- Repeat until you arrive the last number.
- The person who arrives the biggest number wins the game.

**IMPORTANT NOTES !**

- Each icons refers to actual potential.
- Icons that have currently active usage are colored, the others are in grayscale in order to show unused potential.
- Numbers are ordered with the aim of traveling all around of Turkey.

**THE PURPOSE !**

To uncover the situation of renewable energy usage in Turkey by portraying used and unused renewable energy potential.

**Hydropower** **Geothermal Energy** **Biomass** **Solar Energy**

**Wind Energy** **Nuclear Energy**

Greyscale icons refer to unused potential

The potential increases or decreases according to size of the icons

<http://www.enerjiatlası.com> <http://www.yegm.gov.tr> Özgün Evrim Sayılkan

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# WHAT IF NEANDERTHALS COME BACK FROM EXTINCTION?

By Koo Rüstam Guliyev

We all learned that without US (humans), Neanderthals already were influencing the biosphere, so do we really need an ANTHROPOCENE?

What could happen if our siblings the Neanderthals survived the extinction, could they also change the biosphere to their comfort?

Our World

Alternative Neanderthal's World Today

● Sapient today!  
● Neanderthals before the CLIMATE CHANGE!

Neanderthals were responsible for 141 fireplace sites visited in Europe, some of them lead to forest fires.

About 55,000 years ago, the climate began to fluctuate wildly. Neanderthals went extinct by the climate

● The neanderthal population before climate change  
● The neanderthal population after climate change, 85% Neanderthal fossils found was limited to one piece.

Due to interbreeding between Neanderthals and Humans most of Europeans and Mediterraneans have 1-4 percent of Neanderthal Genome.

WE STILL HAVE 1-4% NEANDERTHALS IN US

GREAT APES

Killing Machine

In winters, Neanderthals hunted large animals, which reduced their population.

Because of Humans less than 33 percent of large mammals have chance of surviving.

Anthropocene (1945 year - present)  
Holocene (11 700 - 1945 year)  
Pleistocene (2 588 000 - 11 700)  
Pliocene (5 333 000 - 2 588 000)  
Miocene (23 030 000 - 5 333 000)

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### Moving to Mars Staying Warm on Mars

**Solar Energy:**

**Geothermal:**

**Nuclear Power:**

#### We Evolve to Build the Future Energy for life

Energy Resources	Earth vs Mars
<ul style="list-style-type: none"> <li>&gt; Environmentally friendly</li> <li>&gt; Renewable</li> <li>&gt; Inexpensive tech</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Insufficient for Mars' condition</li> <li>&gt; Dust Storms Blocking the sunlight for weeks</li> <li>&gt; Sunlight intensity 60% of the Earth's</li> </ul>
<ul style="list-style-type: none"> <li>&gt; Viable Renewable Existence of volcanos on Mars proof of thermal heat</li> <li>&gt; Environmentally friendly</li> </ul>	<ul style="list-style-type: none"> <li>&gt; High tech:</li> <li>&gt; Deep drilling</li> <li>&gt; No atmosphere: heat escape</li> <li>&gt; Cooler crust and core than the Earth.</li> </ul>
<ul style="list-style-type: none"> <li>&gt; Sustainable</li> <li>&gt; Carbon free production</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Nonrenewable</li> <li>&gt; Nuclear waste disposal :</li> <li>&gt; leaves hazardous residues</li> </ul>

**Geothermal power plant on Mars**

**Power plant structure:**  
Accessible hot fluid and an overlying accessible cold fluid in order to be used as heat sink.

**Challenge:**  
The mean surface temperature on Mars is about -63°C and the mean pressure is about 7mb, this is while the mean surface temperature on Earth is 15°C and the mean pressure is about 1013mb.

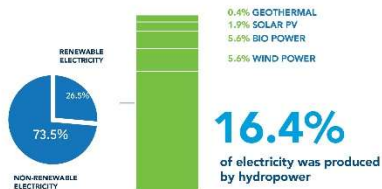
**Result:**  
Cooling in energy extraction from geothermal fluids prevents liquid water from being stable at the surface.

Seydedshahrzad Seyfajehi

# THE HIDDEN POWER HYDROELECTRICITY

## CAPACITY

Hydropower is the world's largest source of renewable energy.

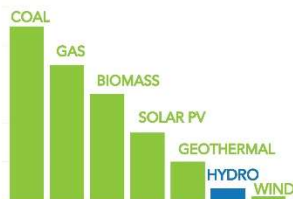


## TOP 5 COUNTRIES IN INSTALLED HYDROPOWER



## KEY FACTS

Hydropower has one of the least Greenhouse Gas emission among all other energy sources.



**4.185 TWh**  
electricity produced by  
hydropower in 2017



That's enough for **ONE BILLION PEOPLE**



### High Initial Cost of Construction

The total cost of the initial project, including the site preparation, transportation cost and the equipment cost is expensive.

### Blocks Fish Migration/Entrapment

Construction of these dams block the fish migration so the habitat of the rivers change and species become endangered. Also many of them die or get harm trying to overpass the dams.

### Causes Resettlement and Flood

People who live near the construction area need to replace. This causes a dispersion of existing system such jobs, lands and other income channels.



#### In India, 1979 ;

- The Machu Dam failed after several hours of overtopping.

In total, 5000-10 000 people died, 150 000 were displaced.

#### In China ;

- Chinese Sturgeon *Acipenser sinensis*
- Chinese sucker *Myxocyprinus asiaticus*
- White sturgeon *Pseudorasbora daniconius*

are threatened by the Gezhouba Dam.



### Clean and Safe

Hydropower's fuel is nothing other than water.

### Available and Reliable

Countries that have large water supply can use it as their main energy source.

### Provides Flood Control

Dams capture the high drainage water and release it in a controlled matter.

### Less Share in Pollution

Because the only fuel hydropower uses is water, carbon emissions are avoided and it produces only a small amount of Green House Gas.

**REFERENCES:**

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Simge Sadak



## THE FUTURE OF RENEWABLE ENERGIES IN GULF COUNTRIES

	<b>UNITED ARAB EMIRATES</b>	7% of installed capacity in Abu Dhabi till 2020 25% of electricity supply in Dubai till 2030 75% of electricity supply in Dubai till 2050
	<b>SAUDI ARABIA</b>	9.6 GW mix of wind, solar and waste to energy till 2023 reduce electricity consumption by 8% till 2021
	<b>BAHRAIN</b>	5% of installed capacity until 2020
	<b>QATAR</b>	1.8 GW solar power till 2030 20% reduction in per capita electricity consumption
	<b>KUWAIT</b>	5.7 GW Concentrated Solar Power 4.6 GW Solar Power 0.7 GW Wind Power, all due 2030
	<b>OMAN</b>	Currently preparing a long-term energy strategy



In 2008, Masdar City, located near by Abu Dhabi, was built as the most sustainable eco-city in the world.



Masdar inaugurate Shams 1, one of the world's largest Concentrated Solar Power (CSP) plants



The Carbon Capture, Usage & Storage (CCUS) project captures up to 800,000 tonnes of Carbon Dioxide (CO<sub>2</sub>) from local region.

### FACTS AND FIGURES

1

Gulf contries hold 29% of all oil reserves. They also have 22% of all gas reserves across the globe. This rate is the highest in the world.

2

The electricity consumption in the Gulf countries had increased rapidly ; 12.4% from 2005 to 2009. This rate is much larger compared to the world.

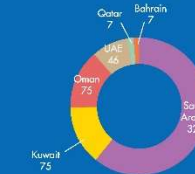
3

It's more likely for them to use renewables, since hydro-carbons is the most important thing they export.

Cumulative installed solar capacity in Gulf, 2018, total: 2660 MW



Cumulative installed wind capacity in Gulf, 2018 total: 537 MW



12896 kilowatt is consumed per capita in average throughout the Gulf, population is around 50 million (1 megawatt = 1000 kilowatt)