China Leading in Renewables and EVs

In Complement to:
CURRENT EVENTS
February 13th, 2018

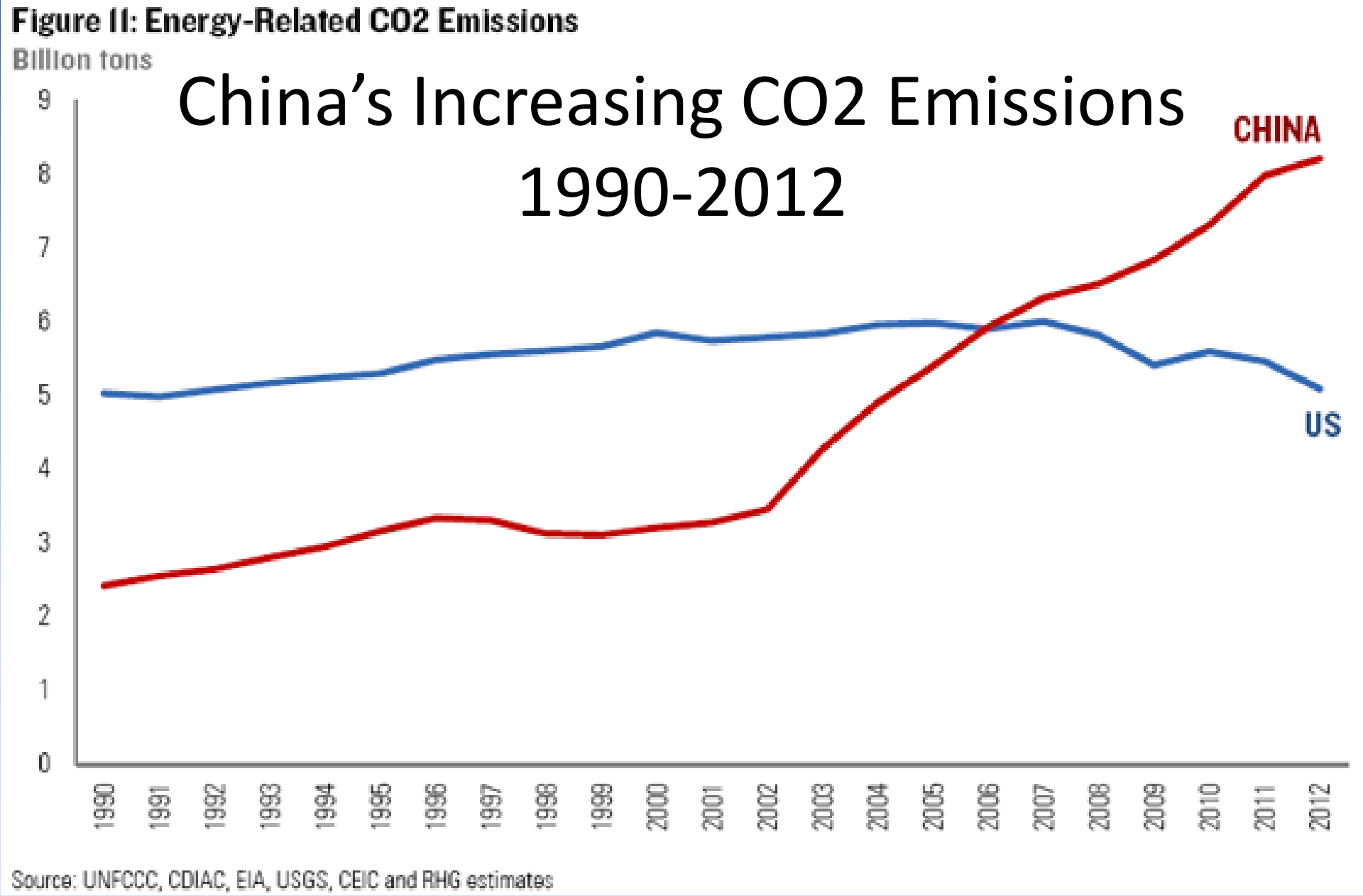
ARTICLE:

China aims to drastically cut greenhouse gas emissions through trading scheme

PV- Photo Voltaic
EV – Electric Vehicle
ICE – Internal Combustion Engine(s)

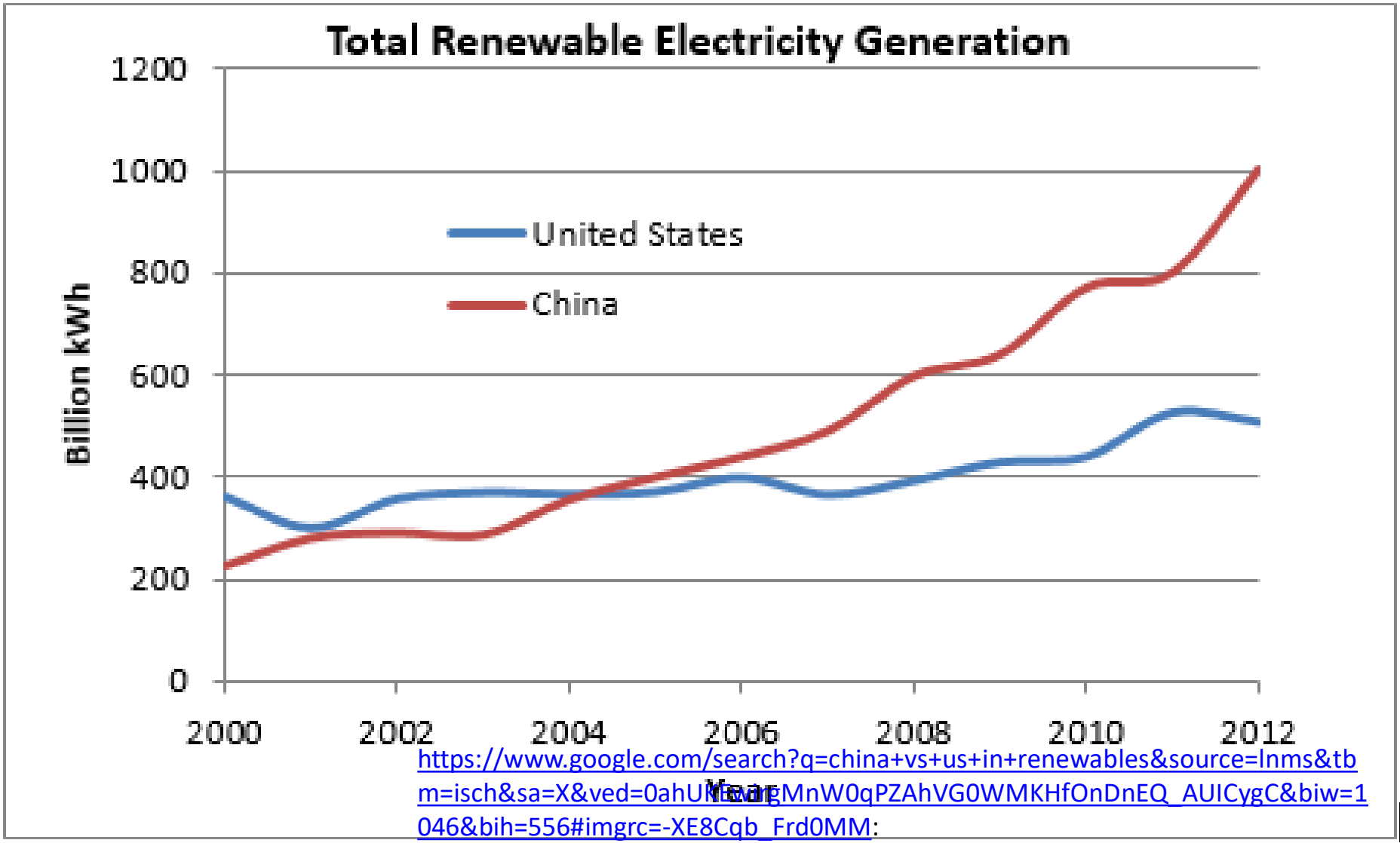
OLLI West Current Events; 2/13/2018
Paul Belanger, Ph.D. Geologist
pebelanger@glassdesignresources.com

China's Increasing CO2 Emissions 1990-2012



https://www.google.com/search?q=china+vs+us+in+renewables&source=lnms&tbm=isch&sa=X&ved=0ahUKEwirgMnW0qPZAhVG0WMKHfOnDnEQ_AUICygC&biw=1046&bih=556#imgrc=-XE8Cqb_Frd0MM:

While at the same time China Ramps up Renewable Electric Generation



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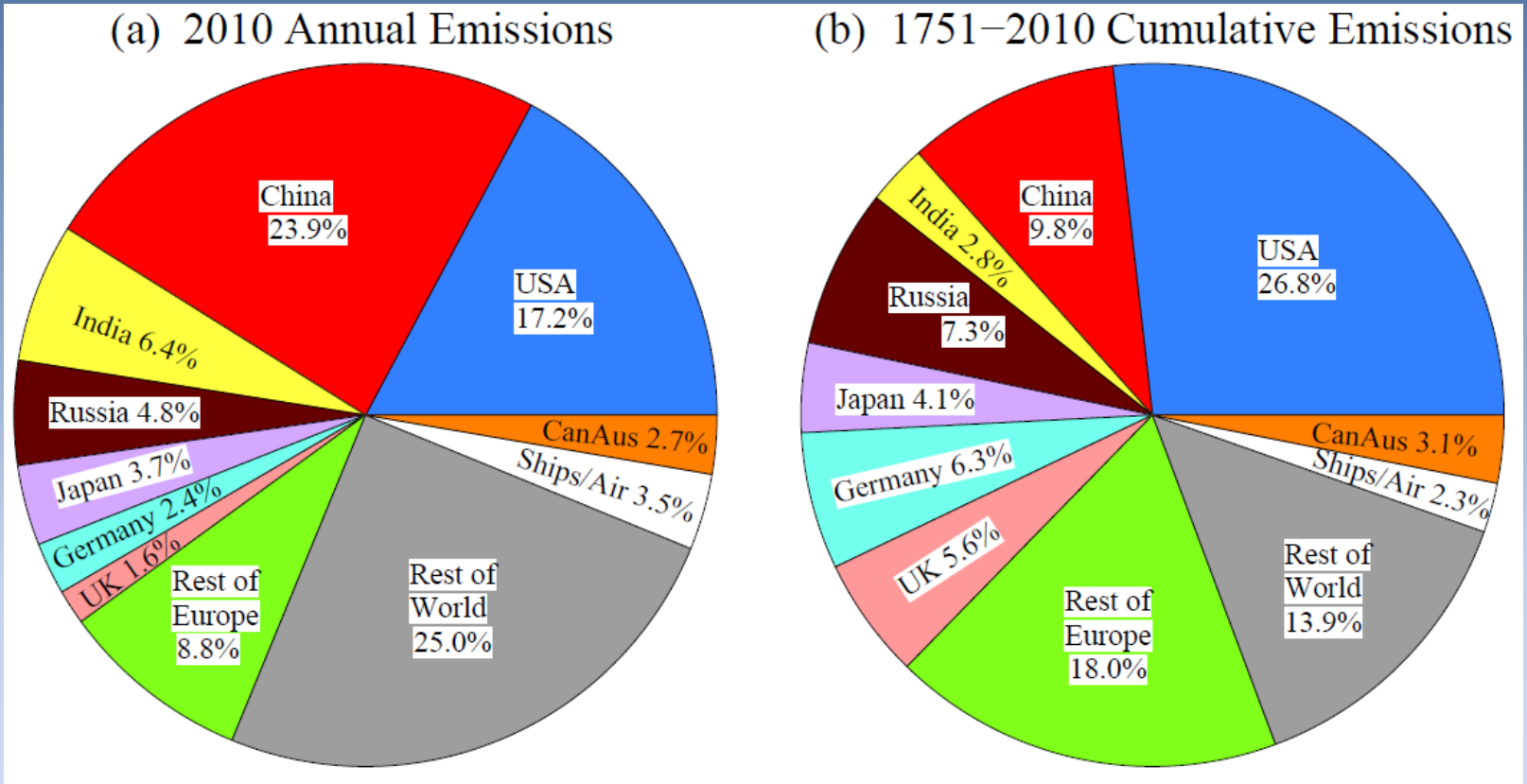
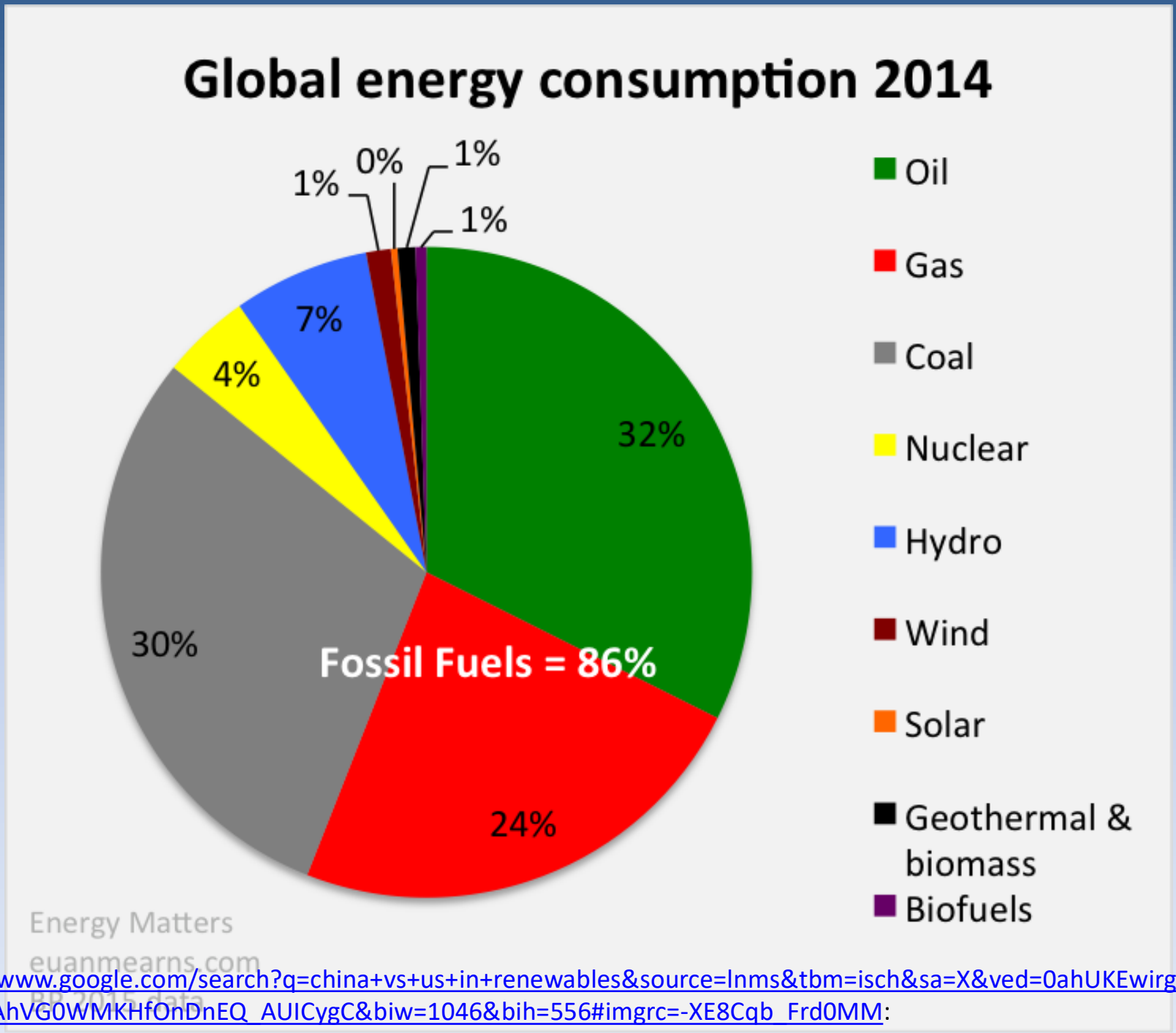
But Keep in Mind Historical #s

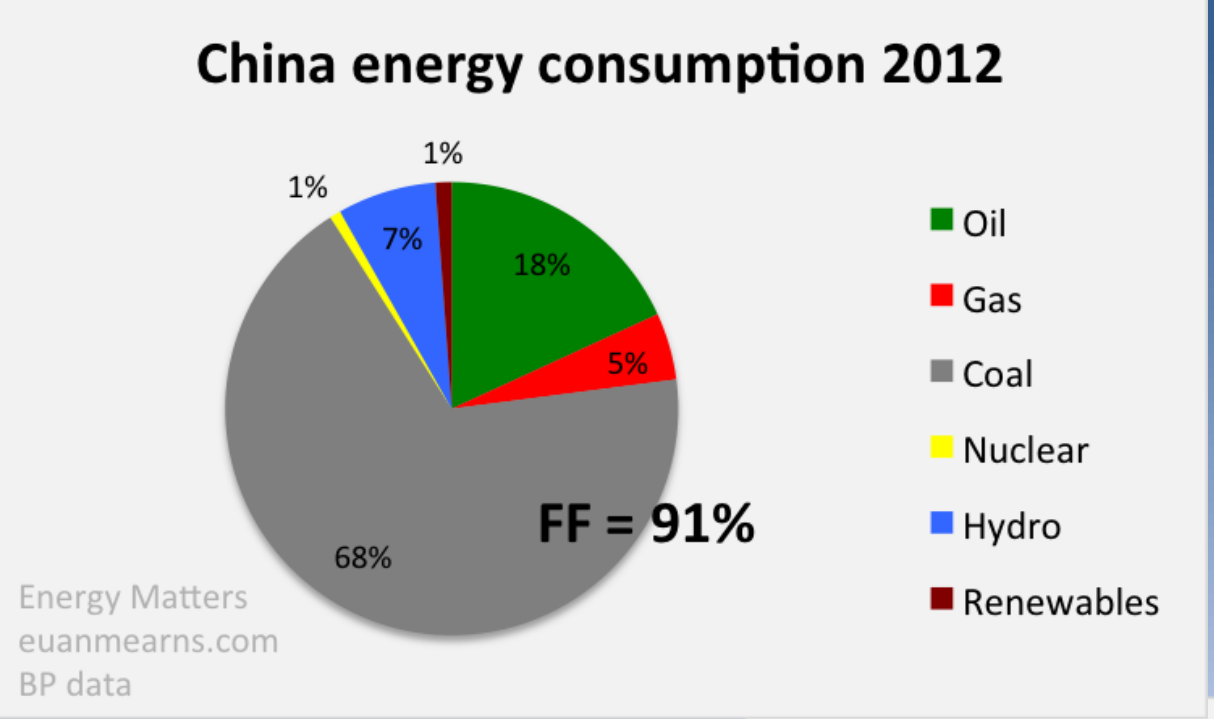


China has the largest fossil fuel emissions today.
However, climate change is driven by cumulative emissions, so developed nations, especially the U.S., have greatest responsibility.

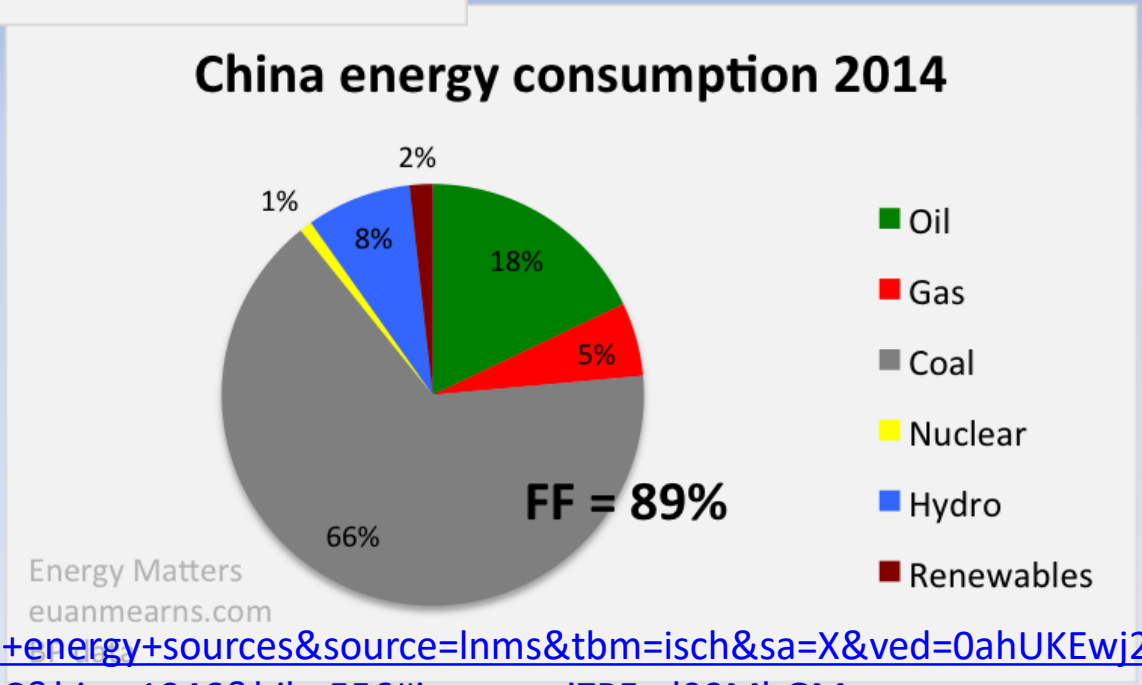
http://www.columbia.edu/~jeh1/



https://www.google.com/search?q=china+vs+us+in+renewables&source=lnms&tbm=isch&sa=X&ved=0ahUKEwirgMnW0qPZAhVG0WMKHfOnDnEQ_AUICygC&biw=1046&bih=556#imgrc=-XE8Cqb_Frd0MM:

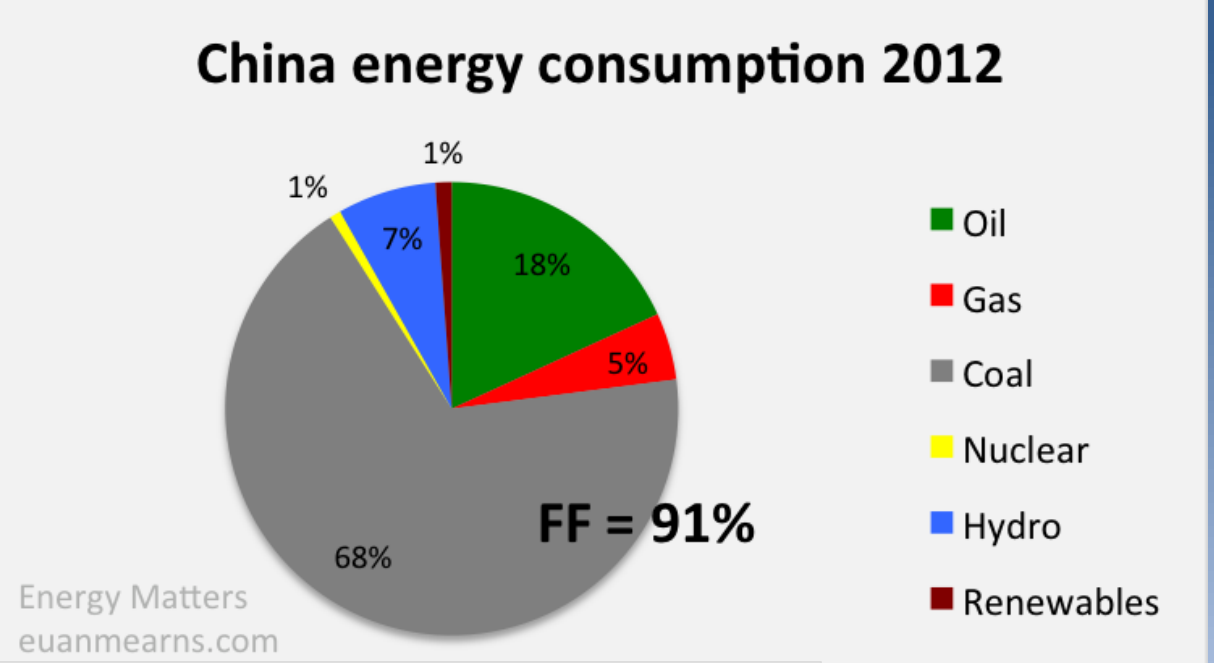


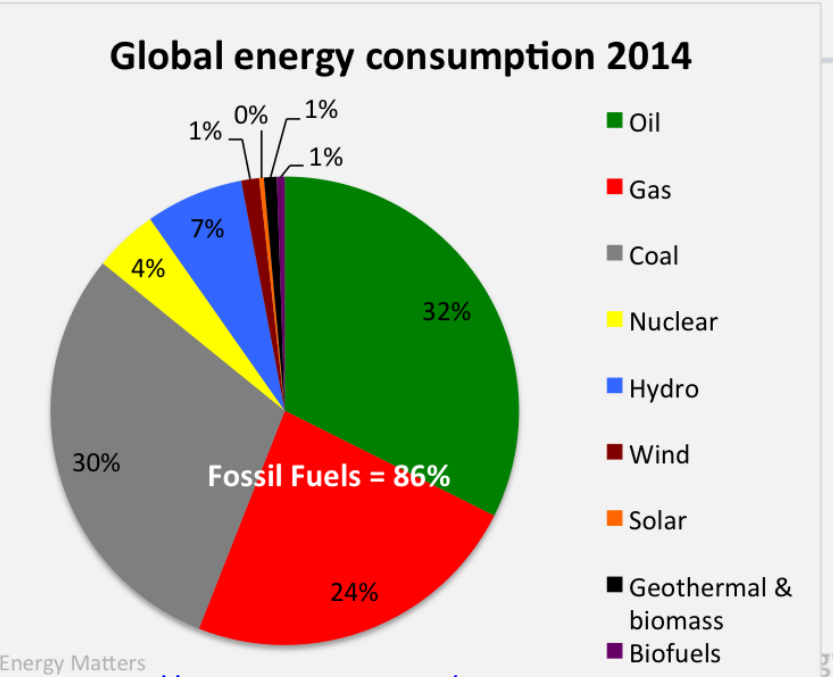
Decreasing Trend 2012-2014

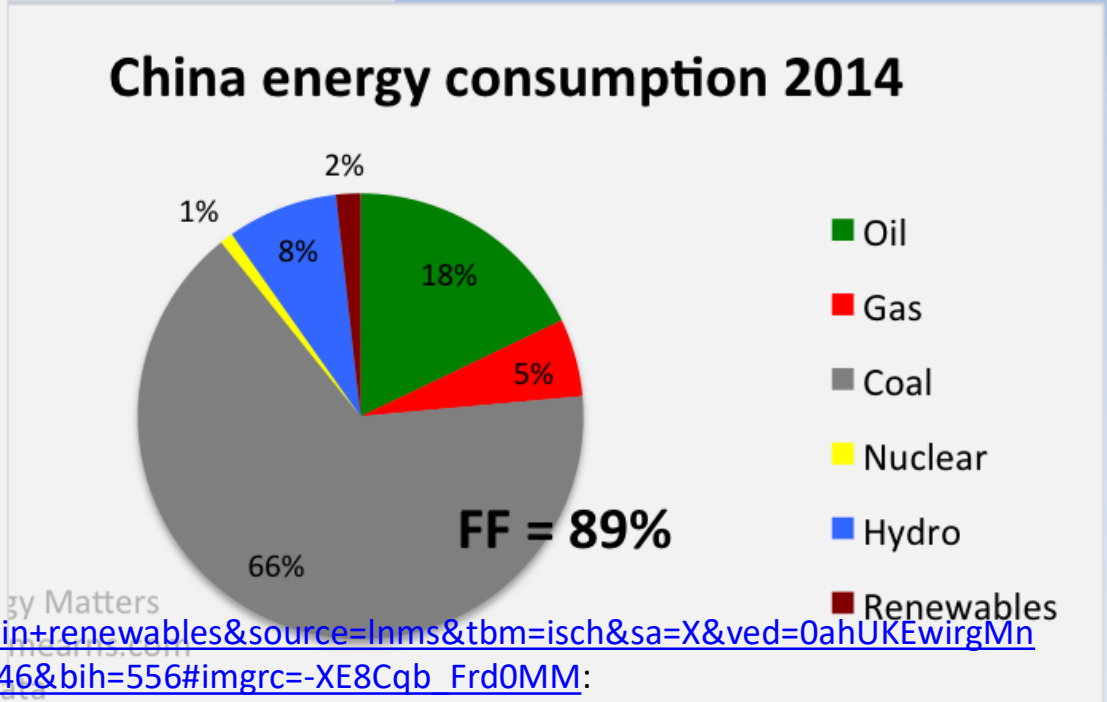


https://www.google.com/search?q=china+energy+sources&source=lnms&tbm=isch&sa=X&ved=0ahUKEwj28bbP0qPZAhUB3GMKHQ5KBzUQ_AUICygC&biw=1046&bih=556#imgrc=ryjZP5vd99MbGM:

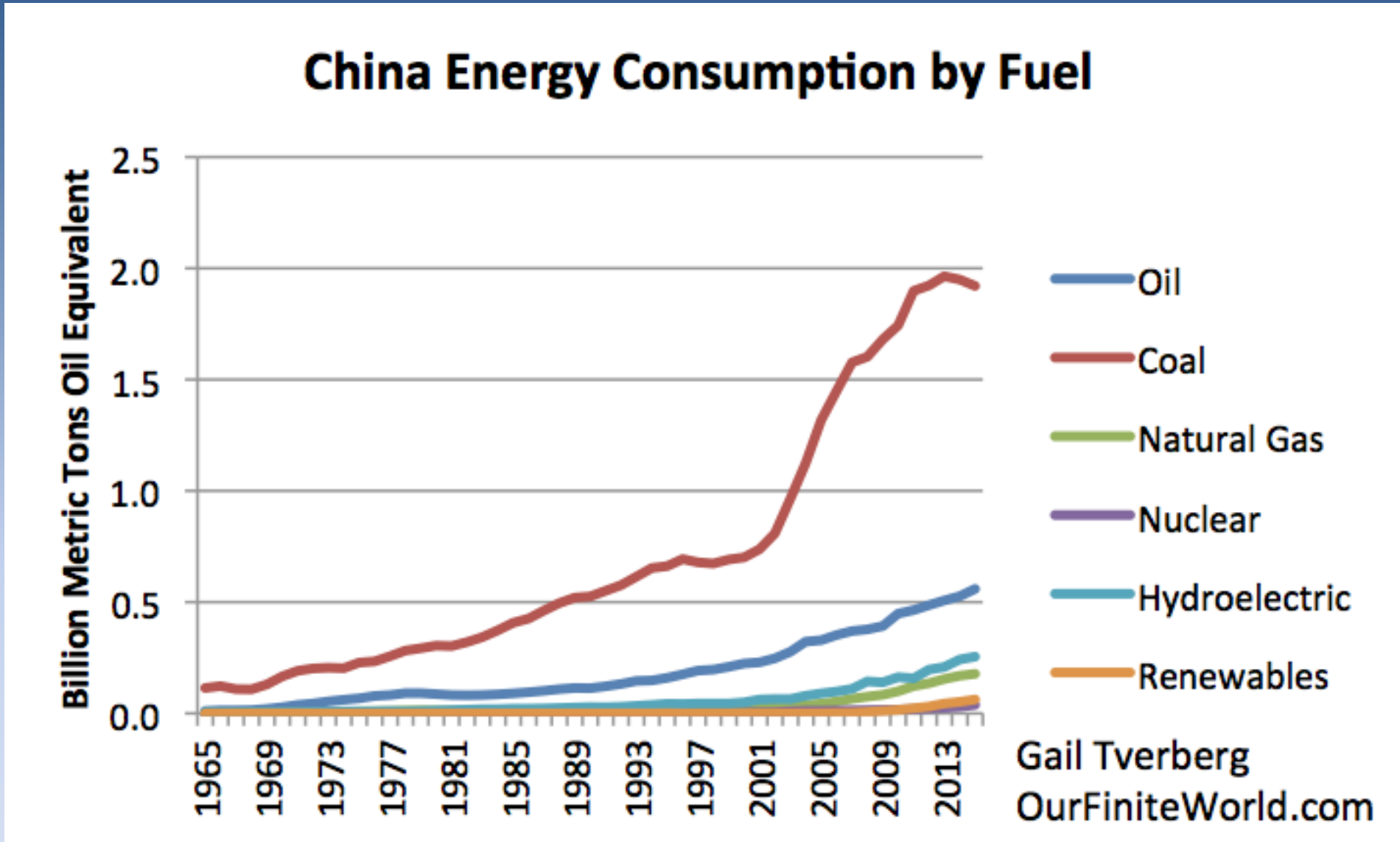
Decreasing Trend 2012-2014







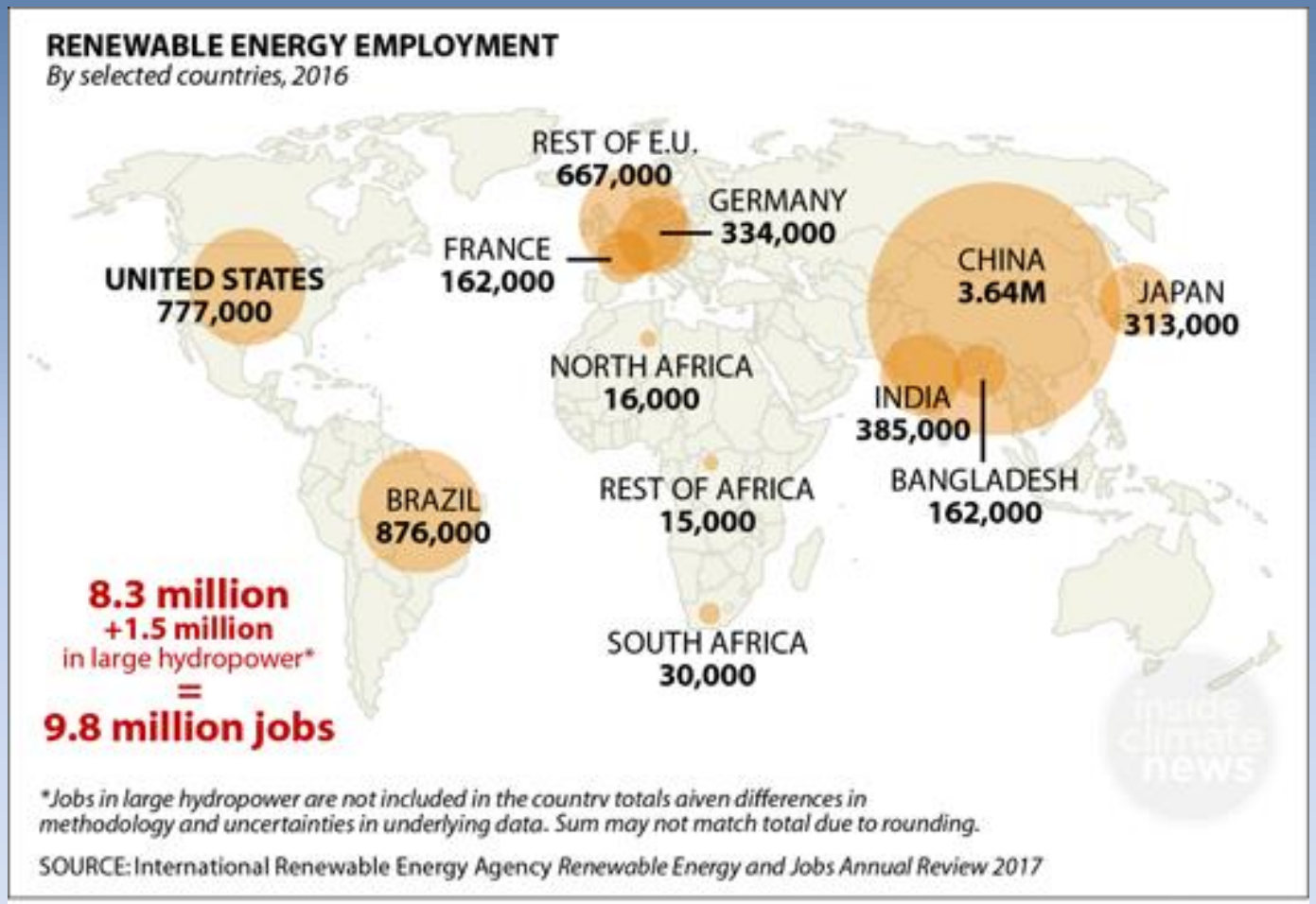
https://www.google.com/search?q=china+vs+us+in+renewables&source=lnms&tbm=isch&sa=X&ved=0ahUKEwirgMnW0qPZAhVG0WMKHfOnDnEQ_AUICygC&biw=1046&bih=556#imgrc=-XE8Cqb_Frd0MM:



https://ourfiniteworld.com/2016/06/20/china-is-peak-coal-part-of-its-problem/china-energy-consumption-by-fuel-to-2015-line-2/

https://ourfiniteworld.com/2017/11/08/will-china-bring-an-energy-debt-crisis/

Employment in Renewable Energy by Country



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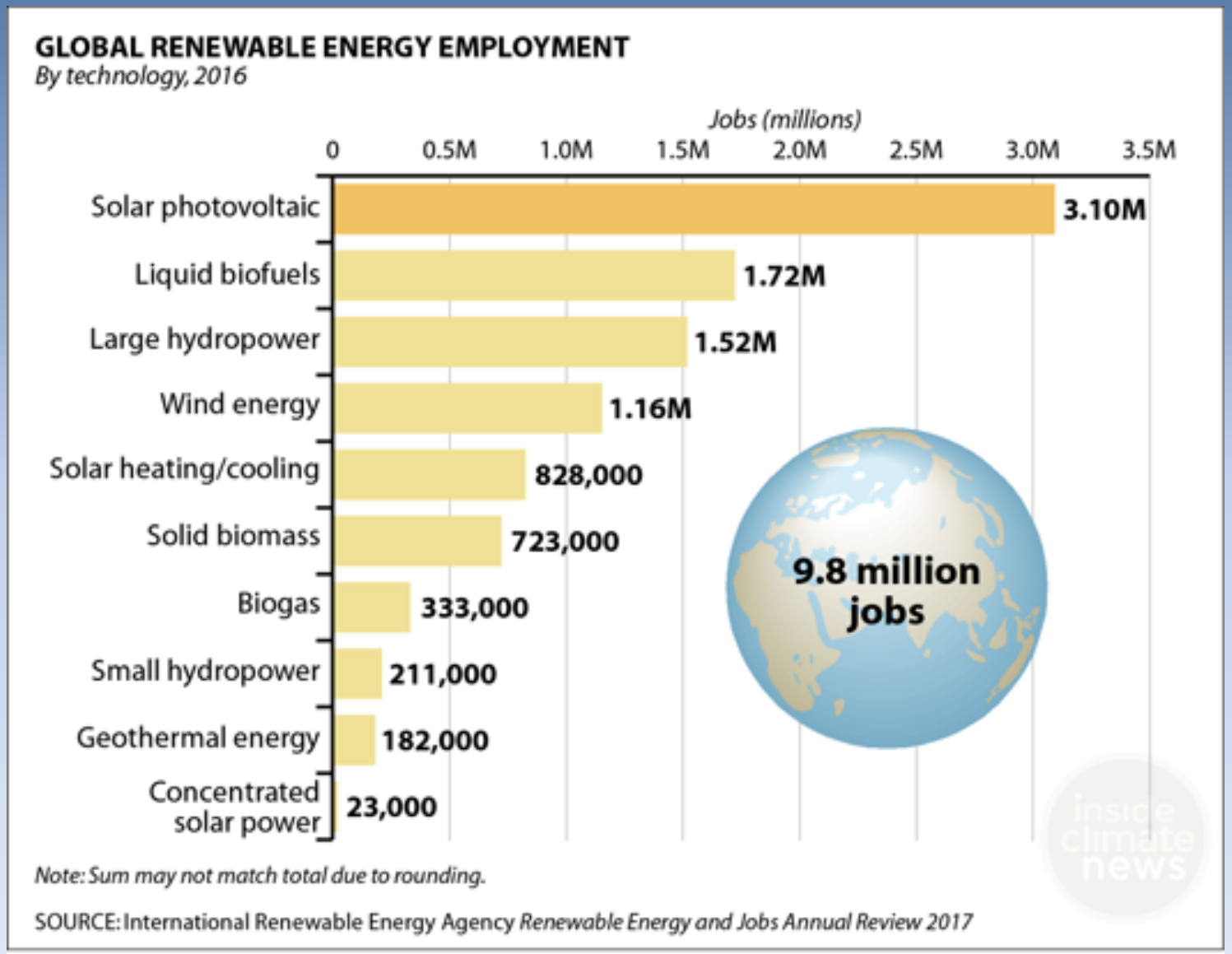
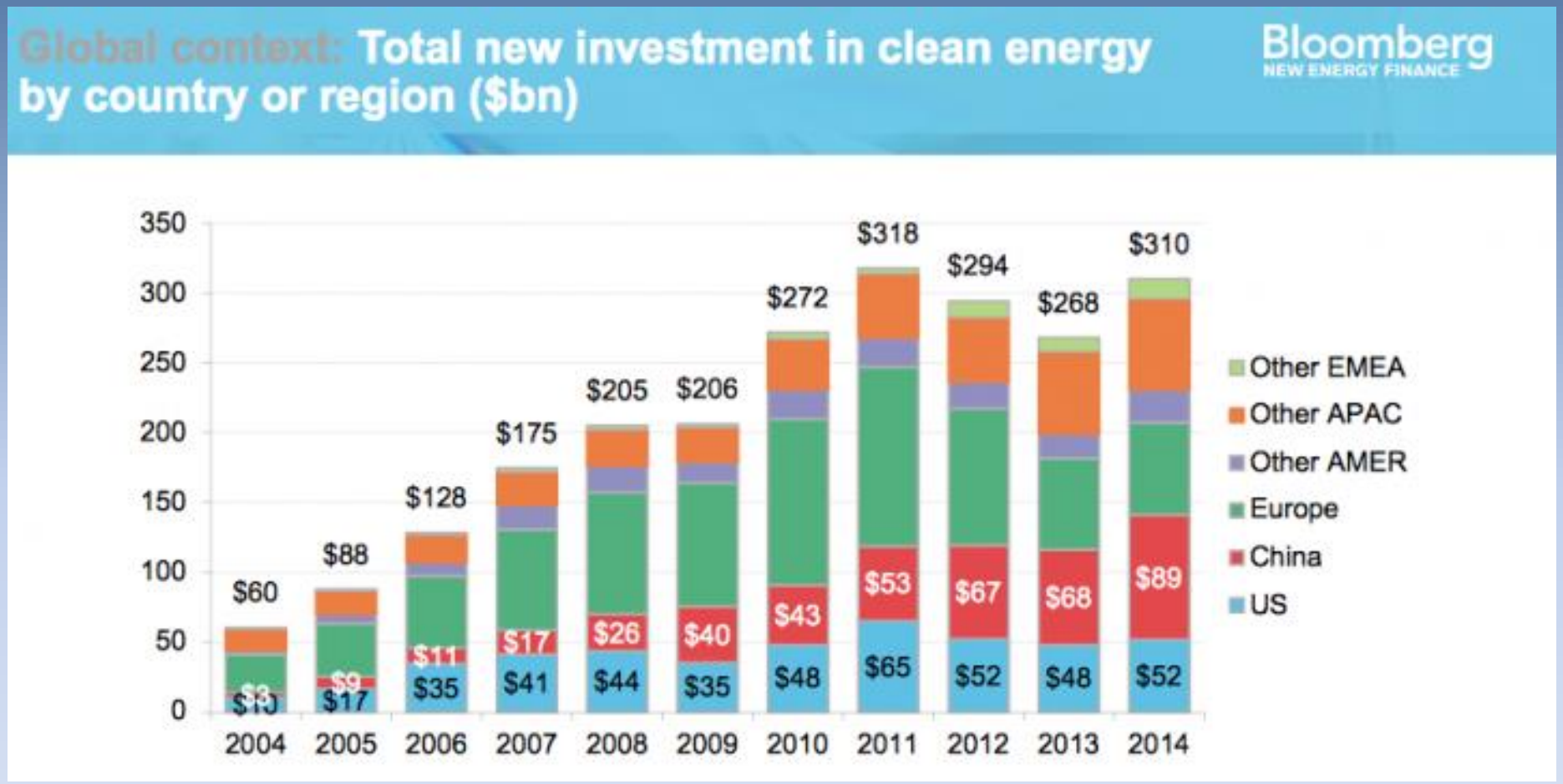
Global Renewable Jobs by Segment



PAUL HORN / InsideClimate News

Investments

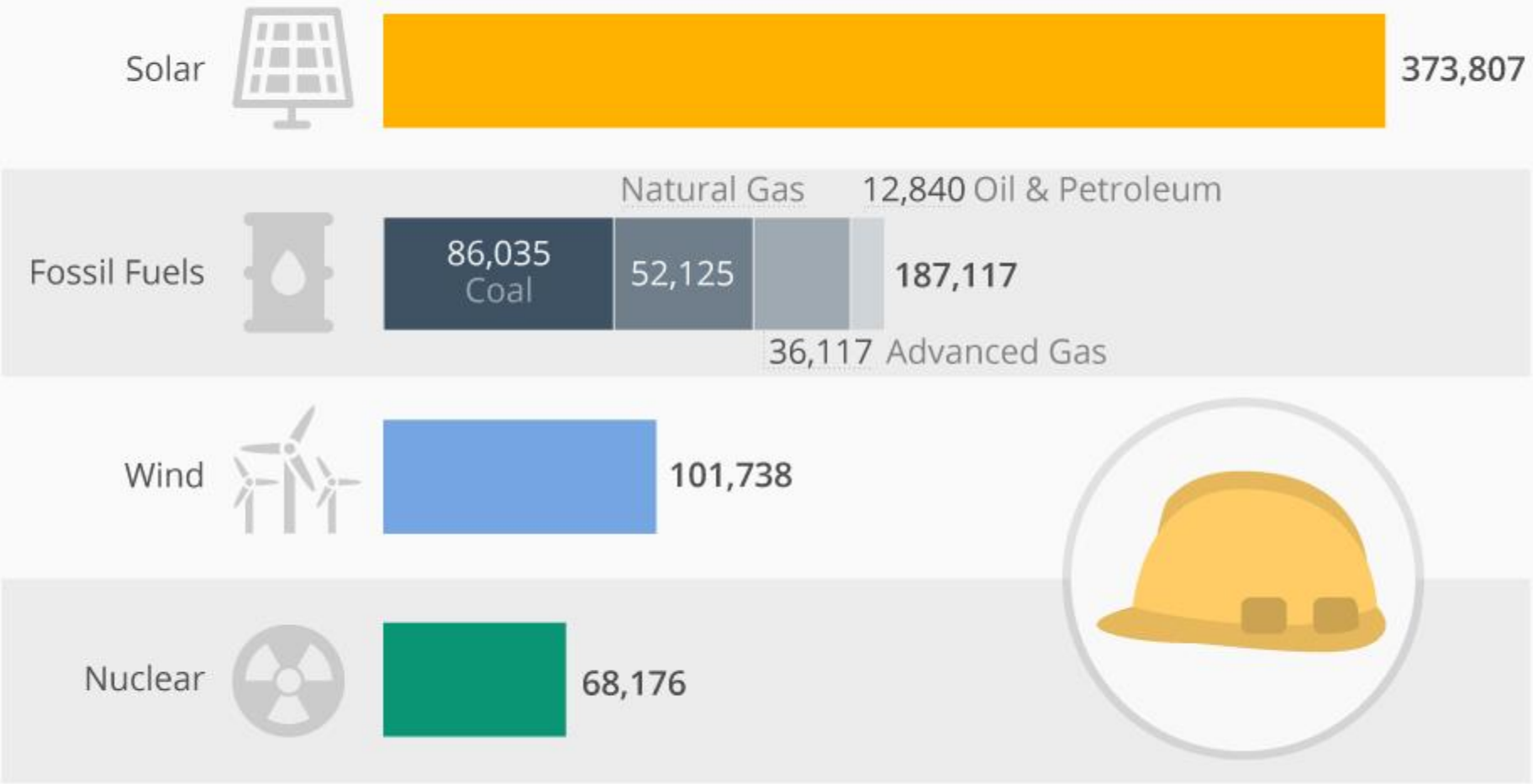


http://www.awaken.com/2015/04/u-s-no-2-to-china-in-clean-energy-investments-in-2014/

https://about.bnef.com/

More Workers In Solar Than Fossil Fuel Power Generation

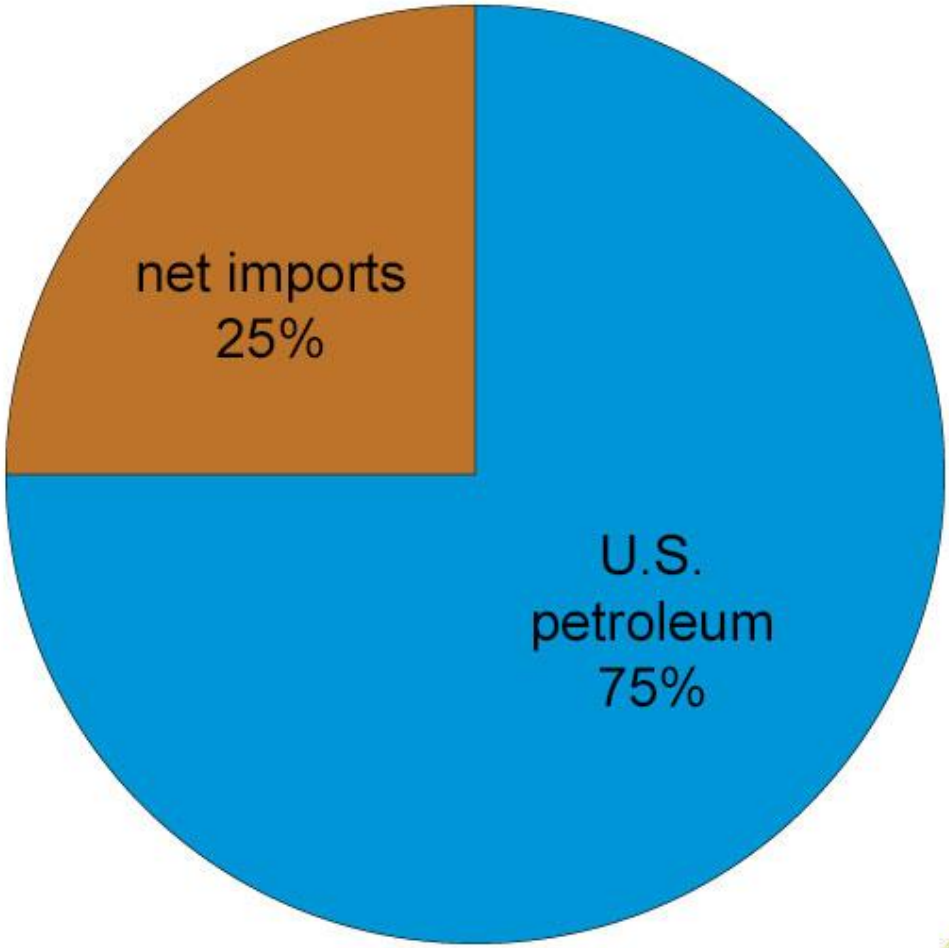
Employment in energy generation by source in the U.S. in 2016



Source: U.S. Department of Energy

statista

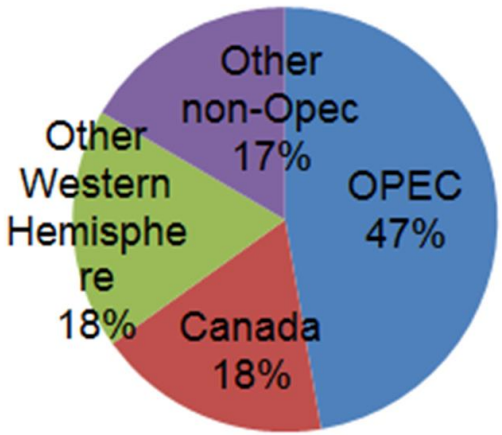
U.S. domestic petroleum production and net imports of petroleum as shares of petroleum consumption, 2016



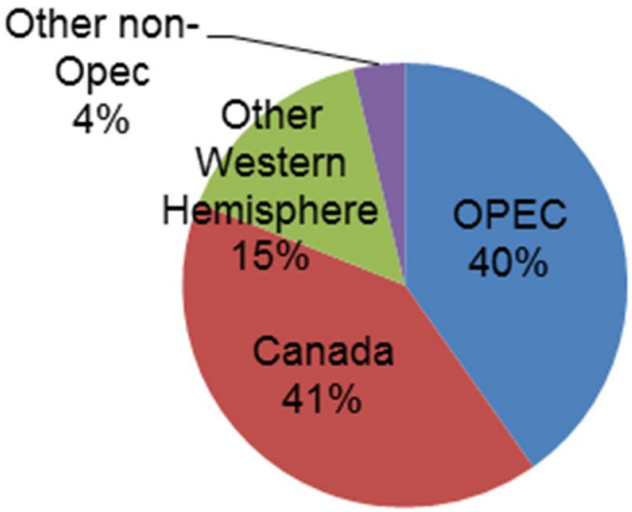
Note: Petroleum includes crude oil, petroleum products, and biofuels.
Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 3.3a, March 2017, preliminary data

https://www.eia.gov/

2006 U.S. Crude Oil Imports
10.0 MMBPD



2016 U.S. Crude Oil Imports
7.8 MMBPD



https://www.google.com/search?q=us+oil+imports+2017&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjJg_L23KPZAhWrxlQKHYbeCzAQ_AUIDCgD&biw=1242&bih=614#imgrc=ZcMiYdrWzxBTZM:

Energy Links

- https://www.eia.gov/
- https://www.iea.org/

- And many more

Adding slides from Great Decisions Regarding China Leading in EVs (Electric Vehicles)

China takes the pole position in the electric-car race

By Justin Worland

Time January 29, 2018

EV – Electric Vehicle
ICE – Internal Combustion Engine(s)

OLLI West Great Decisions; 1/31/2018

Paul Belanger, Ph.D. Geologist
pebelanger@glassdesignresources.com

- Time Magazine:
- Link to pdf: [click here]

Vehicle frames await testing in leading car-maker BYD's lab in Shenzhen, China

China takes the pole position in the electric-car race

By Justin Worland

FROM A CURSORY LOOK AT THE RECENT NEWS FROM Tesla, a casual observer could be forgiven for thinking that the dream of transitioning the world to electric vehicles has stalled. The Tesla brand is more closely associated with electric vehicles than any other, and in the past year the company has struggled to deliver the $35,000 Model 3. CEO and founder Elon Musk described the internal delays related to producing Tesla's battery and an outside supplier's falling behind as "production hell," while customers vented on social media and the company declared a record third-quarter loss of more than $600 million.

As Tesla scrambles to maintain its position as the world's foremost electric-vehicle brand, traditional automakers in the U.S. and Europe have invested billions of dollars to advance the technology. And a slew of Chinese companies are churning out hundreds of thousands of electric vehicles a year.

"The story is not just about Tesla anymore," says John Gartner, an analyst at Navigant Research. "There's an ecosystem."

The battle will determine which country dominates the global market for electric vehicles, which are forecast to be a third of all passenger vehicles on the road by 2040, up from less than 1% today, according to Bloomberg New Energy Finance. Currently, China has the upper hand.

"It's clearly the case that China will lead the world in EV development," William C. Ford Jr., the executive chairman of Ford Motor Co., said in Shanghai in December, according to the New York Times.

5,000
Number of Model 3s Tesla says it will build weekly by midyear; the company had earlier said it would hit that target last year

700K
Number of electric cars sold in China in 2017, according to preliminary figures

54%
Percentage of global car sales expected to be electric by 2040

In some ways, Tesla's "production hell" helps explain why China is better situated to develop the electric vehicle of the future. Despite top design, engineering and marketing talent, Tesla has struggled with basic manufacturing. Automated processes have failed on the factory floor, and the company has struggled to secure the supply chain to operate on the scale it needs to produce a mass-market electric vehicle. Musk has taken responsibility for the delays while also downplaying their significance. "In the grand scheme of things, this is a relatively small shift," he told investors in October.

CHINA HAS INVESTED heavily in policies to develop its electric-vehicle industry. It has offered subsidies to buyers to the tune of $15,000 per vehicle, threatened to block automakers that don't make electric vehicles from selling traditional cars and funded electric-vehicle infrastructure like charging stations across the country's highway network. Earlier this month, China simply halted production of more than 500 models of heavily polluting cars. China is expected to spend some $60 billion in electric-vehicle subsidies in the half decade preceding 2020, according to a *Financial Times* analysis.

That focus has helped foster a slew of Chinese automakers like BYD Auto, Great Wall Motor and Lifan Auto. Chinese automakers are expected to produce more than 4.5 million electric vehicles annually in 2020, compared with about a million from Tesla, according to data from the International Energy Agency.

To date, Chinese electric vehicles have largely remained a product for the developing world, while Tesla has thrived in the European market. But Chinese automakers recently ramped up efforts to expand their global reach, and at least one company—GAC Motor—plans to sell cars in the U.S. as soon as next year.

"Sometimes people are under the impression that China is either dragging their feet or somehow behind the U.S. in terms of sustainable-energy promotion," Musk said at a conference last summer. "But they are by far the most aggressive on earth."

Take away points

- CHINA LEADS
  - 700,000 EVs sold in China 2017
  - Vs. ~25,000 U.S. (https://www.fleetcarma.com/electric-vehicle-sales-united-states-2017-half-year-update/
  - 54% GLOBAL car sales expected by 2040 (likely sooner)
  - Not just Tesla anymore
    - Production issues on factory floor
    - China leads
  - EXPANDING GLOBALLY – EXPORTING!

Take away points

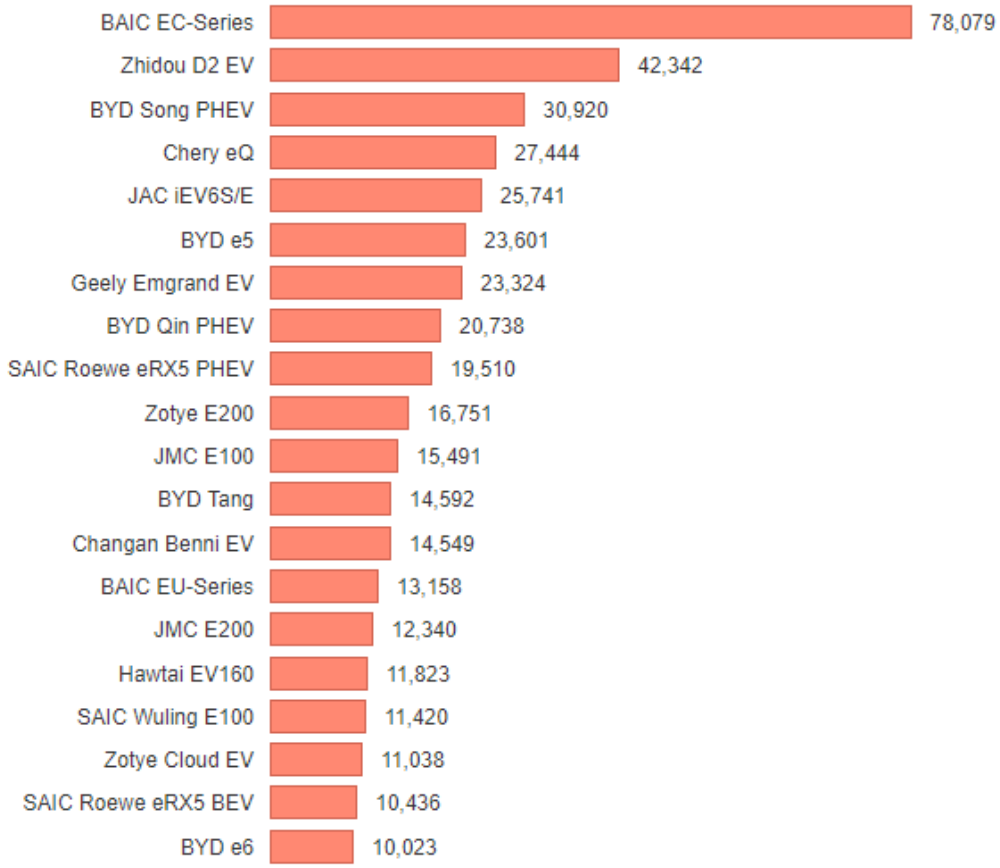
- CHINA INVESTS:
  - $15,000 SUBSIDY vs. U.S. $7,500 AND uncertain future
  - CHINA: $60 Billion by 2020 in subsidies
  - China HAS funded EV infrastructure charging stations across the country's highway network
  - WILL block ICE cars (Internal Combustion Engines)

January 29th, 2018 by **Jose Pontes**

China Electric Car Sales

Sales figures here are not 100% official.

December **2017**

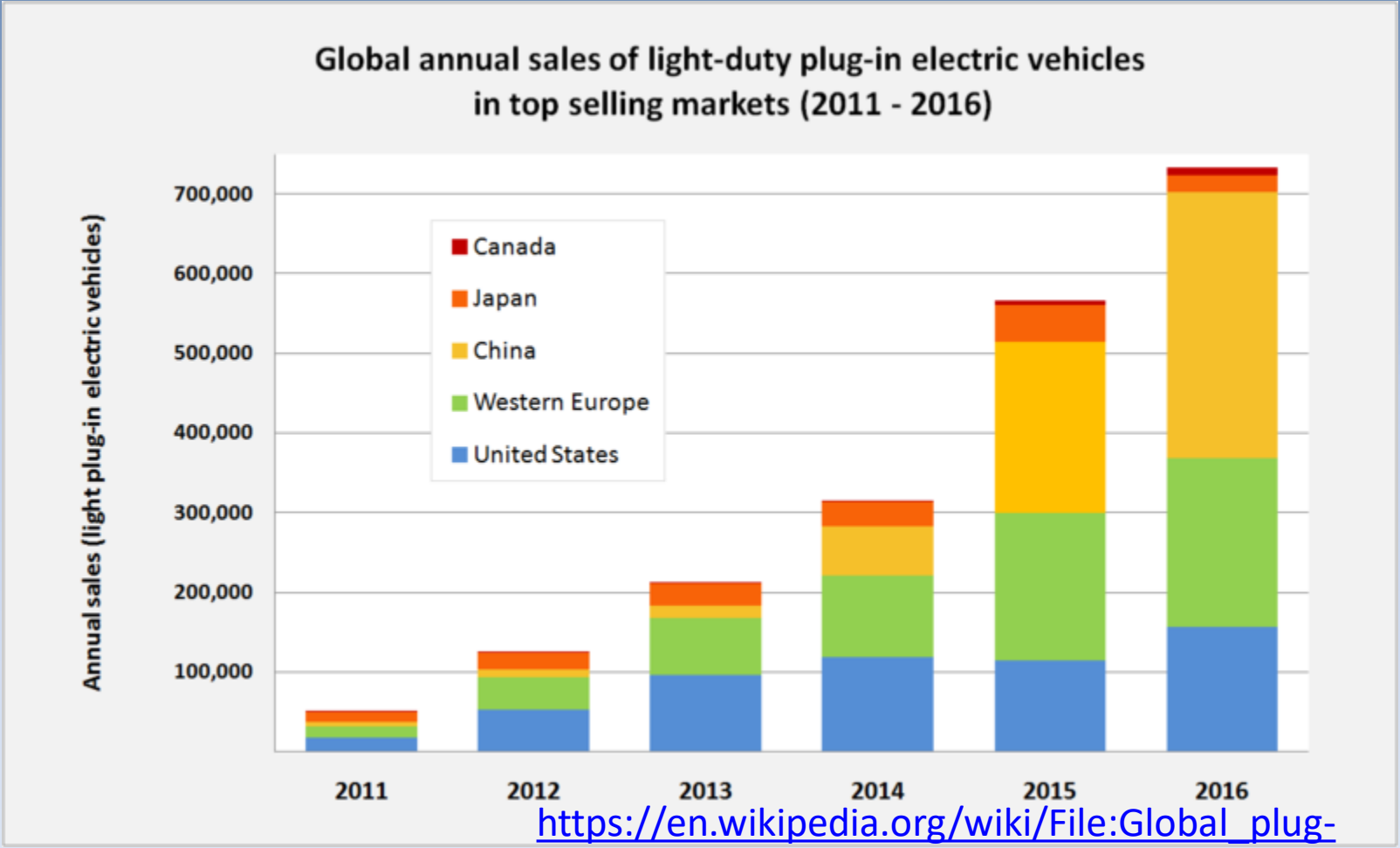


** = estimate*

Source: CleanTechnica & EV Obsession • Get the data • Created with Datawrapper

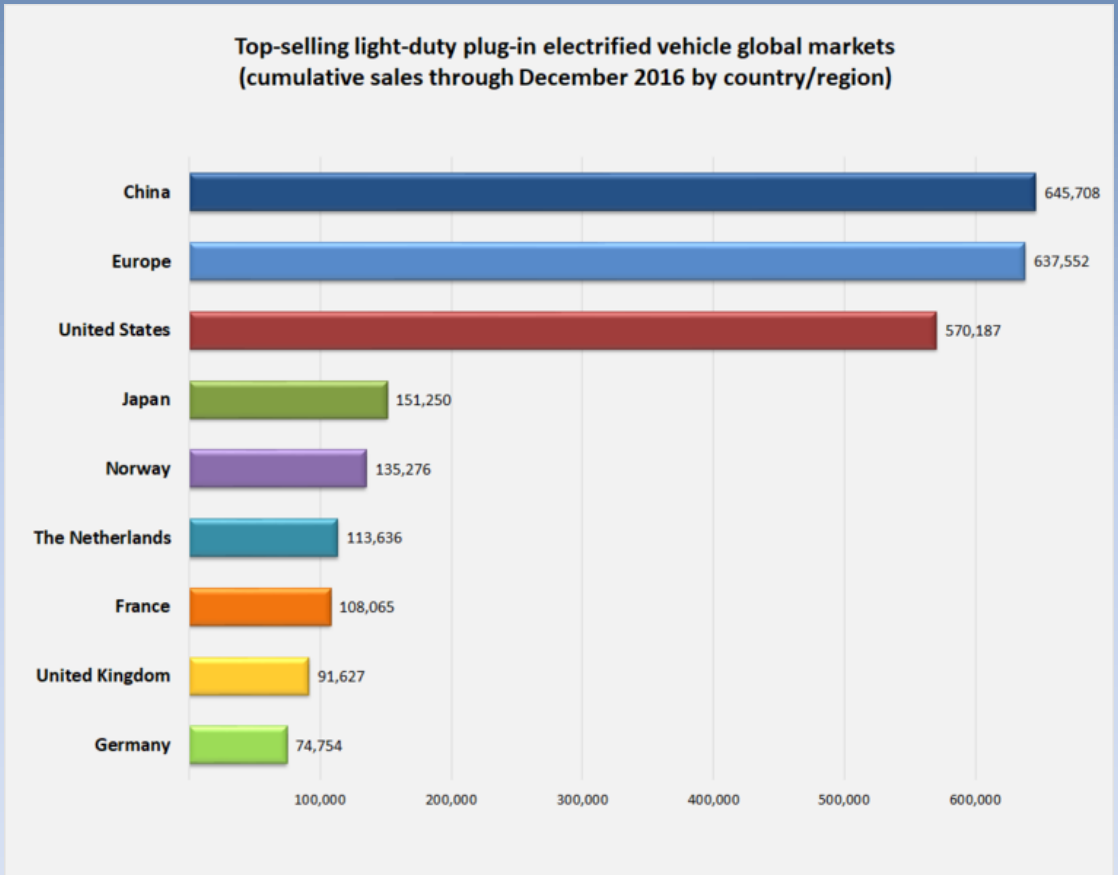
https://cleantechnica.com/2018/01/29/2017-china-electric-car-sales-blow-world-water-baic-ec-series-superstar/

Note: While U.S. Stays flat, China and Europe forging ahead



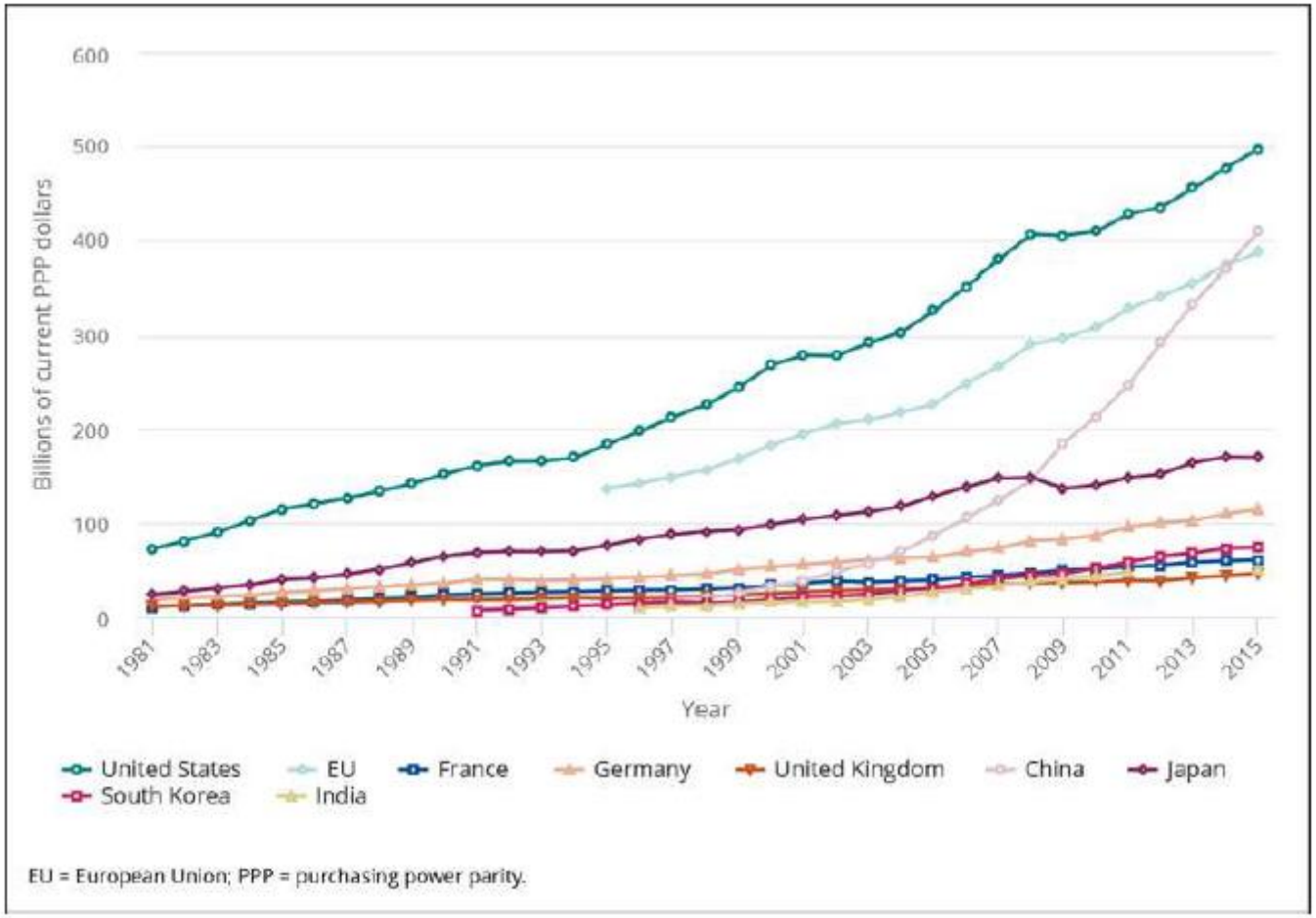
https://en.wikipedia.org/wiki/File:Global_plug-in_car_sales_since_2011.png

2016 Data



https://en.wikipedia.org/wiki/File:Top_PEV_global_markets_stock_Dec_2016.png

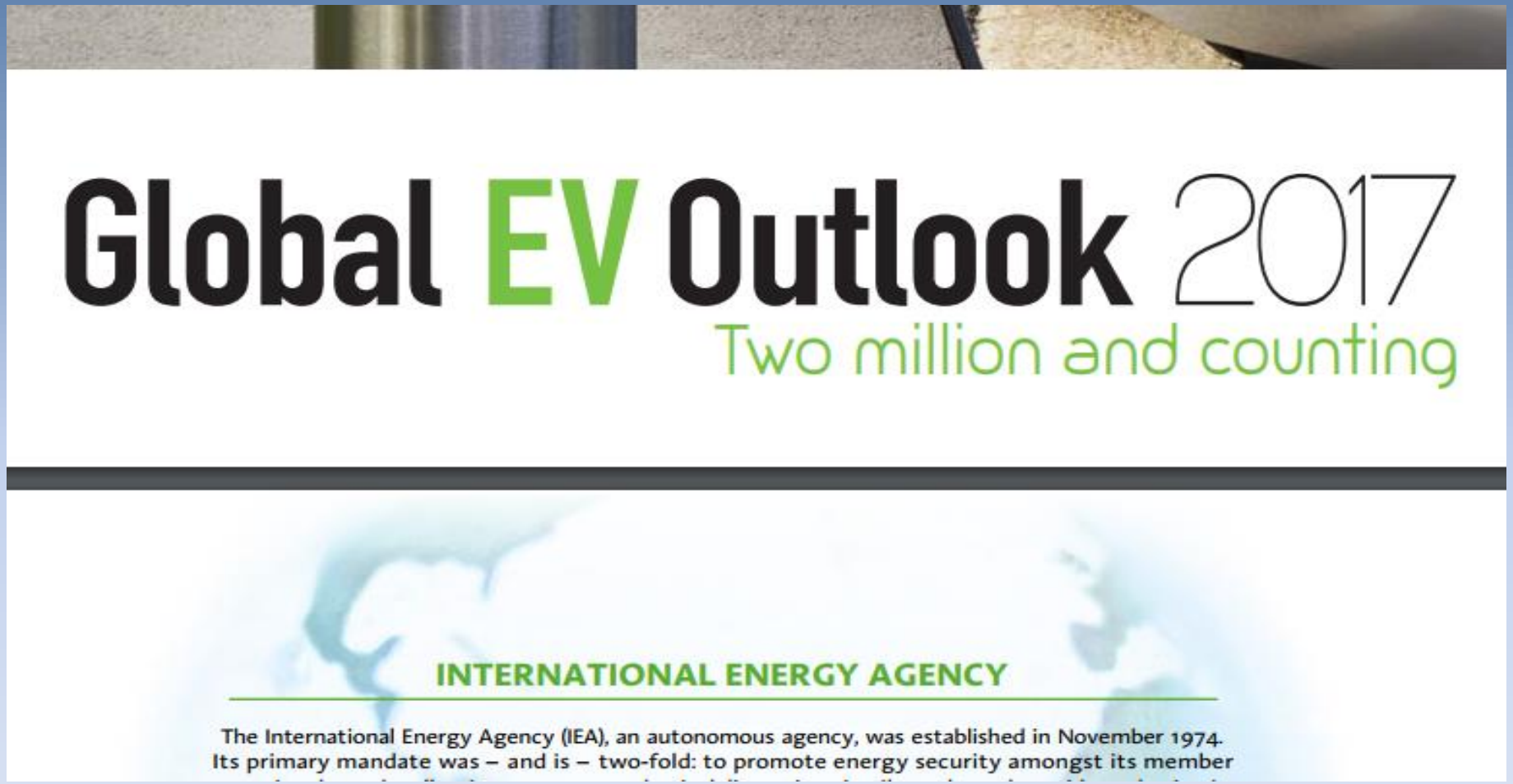
China Catching Up to United States in Research and Development



LINK to PDF:

- https://eos.org/articles/china-catching-up-to-united-states-in-research-and-development?utm_source=eos&utm_medium=email&utm_campaign=EosBuzz012618

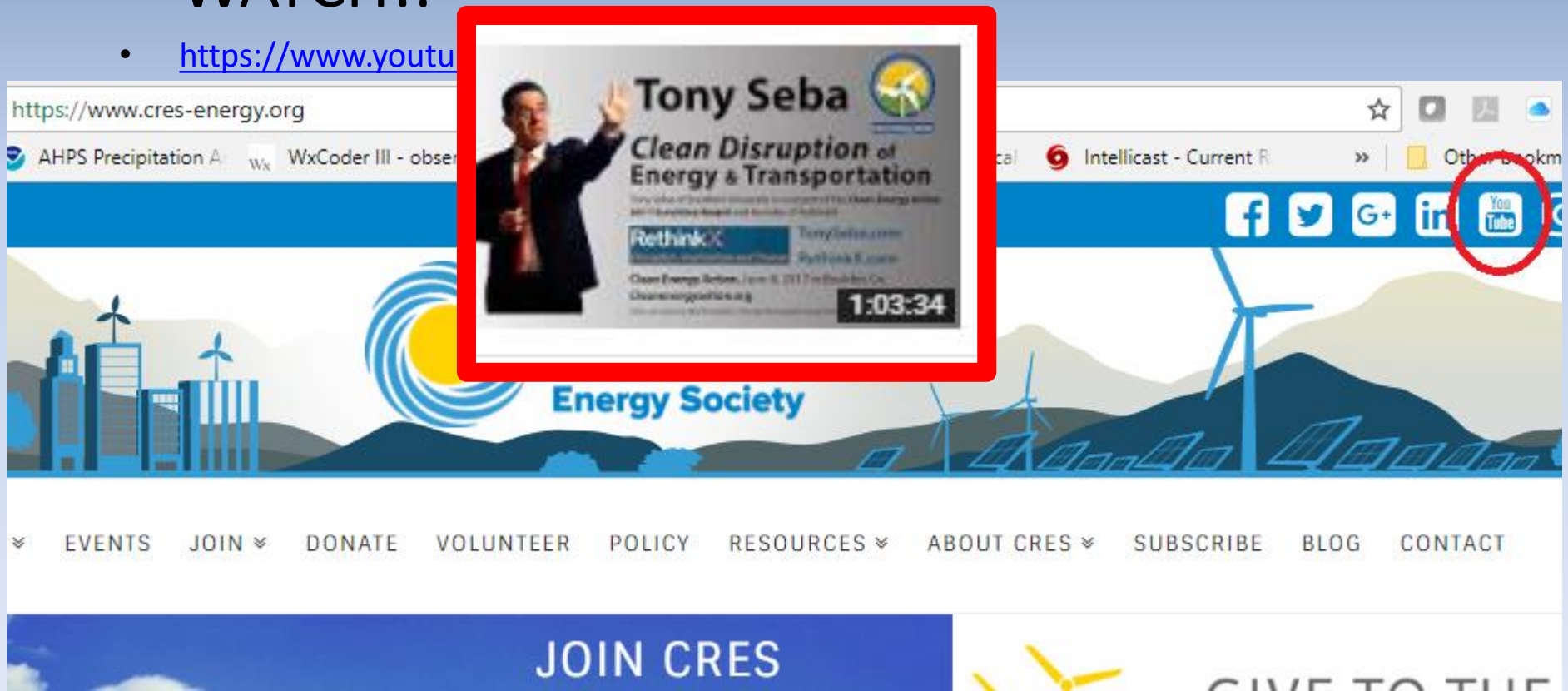
International Energy Agency (IEA) Study:



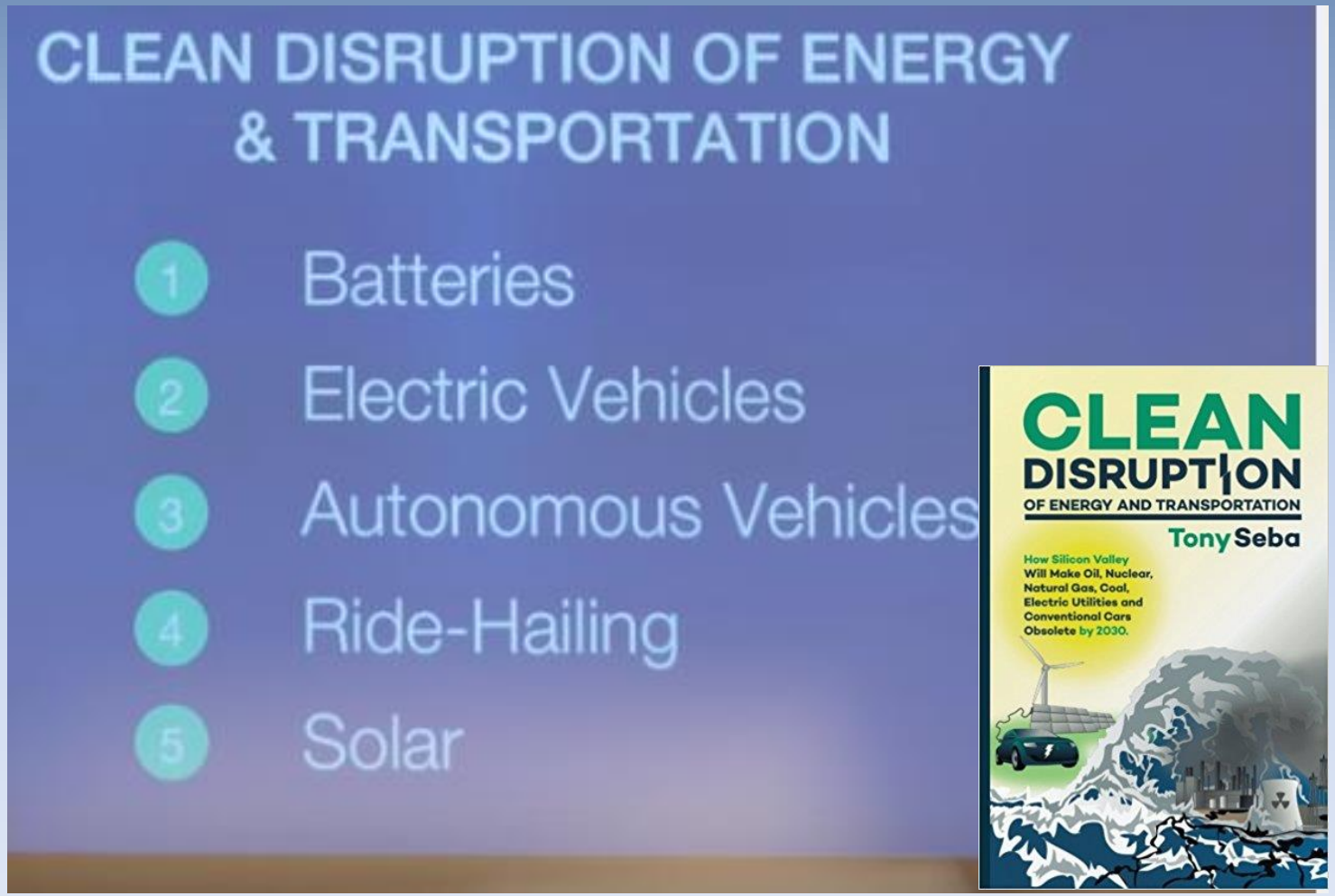
https://www.iea.org/publications/freepublications/publication/GlobalEVOutlook2017.pdf

YouTube Channel of the Colorado Renewable Energy Society (CRES): https://www.cres-energy.org/

- VIDEO: TONY SEBA – JUNE 2018 – A MUST WATCH!:
- https://www.youtu



Tony Seba: Clean Disruption - Energy & Transportation



Other CRES YouTube Videos:

https://www.youtube.com/channel/UCr81EUb2qVJVfmmlJMxEHVw/videos?disable_polymer=1

- Driverless Cars and the Environment - Rutt Bridges, Futurist https://youtu.be/0BWJcpesr6A
- Ramping Up Solar to Power the World - Greg Wilson, NREL https://youtu.be/7CDPHxcnq4c
- Bill Ritter - Powering Forward. The Clean Energy Revolution can't be stopped https://youtu.be/agowW1QKwms
- Can Hydrogen Save our Energy System? Mark Ruth, NREL https://youtu.be/4u93y-l0cwM
- Where Are Hydrogen Fuel Cell Vehicles today? (Oct-2016) https://youtu.be/WpqaVATWgnA

Wirth Chair Talk by Amory Lovins:
PDF Link: click here

The Gasoline-Powered Automobile Is Obsolete

Electric Drivetrains Simply Make the Most Sense and Are Now More Practical and Affordable for Cars & Trucks

Jim Smith, January 26, 2018

- For a full set of Jim Smith's slides click here

Courtesy Jim Smith

Incentives

Electric Cars Are Already Affordable Because of Federal/State Tax Credits

$7,500 Federal tax credit
$5,000 Colorado rebate at purchase

Courtesy Jim Smith

And if you're against Incentives UNDERSTAND that there are Oil and Gas incentives

- Incentives exist temporarily to support new technologies.
- Have a look here to see those Billions of incentives for Oil and Gas – not exactly NEW technology:
  - CO bill 18-002: https://leg.colorado.gov/bills/sjm18-002
  - Worth the read to see how many billions of subsidies exists https://leg.colorado.gov/sites/default/files/documents/2018A/bills/2018a_sjm002_01.pdf
  - Current status 1/25: postponed indefinitely

Other Countries Are Further Along in the Manufacture and Adoption of Electric Vehicles

Unsubsidized EV costs

ALL ELECTRIC:
2018 Nissan Leaf - $30,877
2017 Chevrolet Bolt - $36,620
2018 Tesla Model S 75D - $74,500
2018 Tesla Model X 75D - $79,500
2018 Tesla Model 3 - $35,000
2018 Ford Focus Electric - $31,075
2018 Kia Soul EV Wagon - $33,145
2017 Fiat 500e - $34,085
2017 Mercedes-Benz B250e - $46,075
2018 BMW i3 - $48,645
2017 Mitsubishi i-MiEV - $24,390
2017 Smart car-EV - $14,000

SERIAL HYBRID: Electric runs first with backup ICE (Internal Combustion Engine)
2018 Chevrolet Volt - $33,220
Possibly some above too

Modified from Courtesy Jim Smith

REMEMBER

CURRENT FED SUBSIDY = $7,500
CURRENT COLORADO = $5000

= $12,500 IF YOU LIVE IN COLORADO

The New 2018 Leaf – 150 mile range

Other EVs

Bolt - EV

Kia Soul Wagon - EV

Kia Soul Wagon – EV

Tesla Model 3

National Renewable Energy Lab (NREL)

- https://ww.nrel.gov/
- Hydrogen fuel cell impacts: https://www.nrel.gov/hydrogen/impacts.html
- Are fuel cell (hydrogen) cars the future?: https://www.nrel.gov/workingwithus/avf-fuel-cells.html

Links

- Local Denver EV newsletter/meetings: http://devc.info/
- https://www.greencarreports.com/
- https://en.wikipedia.org/wiki/Electric_car_use_by_country
- Colorado Renewable Energy Society (CRES): https://www.cres-energy.org/
- CRES YouTube Channel: https://www.youtube.com/channel/UCr81EUb2qVJVfmmlJMxEHVw
- .

For tips on sustainable building and home upgrades and retrofitting:

- https://www.solardecathlon.gov/
- http://www.avenson.net/

- Ethics and Ecologic Forum meetings and past meeting notes: http://denverclimatestudygroup.com/?page_id=683
- next meeting 2/26
- Toward a Sustainable well-being: http://denverclimatestudygroup.com/wp-content/uploads/2014/10/Toward-a-Sustainable-Wellbeing-Economy-v4.pdf

- Feel free to contact me regarding other thoughts/info/links on sustainability: PEBelanger@glassdesignresources.com 303-249-7966
- Lots of info at http://denverclimatestudygroup.com/ and https://www.facebook.com/denverclimatestudygroup/

My Advice to Americans:

Don’t buy a new gas-powered car. If the type of vehicle you want is not available today, it will be within 5-10 years at most.

Courtesy Jim Smith

Can't Afford a New EV?

Used EVs are a super deal & a smart buy!

2015 Nissan Leaf - $11,569 (Boulder Nissan)
2015 Chevy Volt - $15,061 (Emich Chevrolet)
2017 Chevy Bolt - $27,727 (Cargurus.com)
2013 Tesla Model S - $39,494 (Trucar.com)
OTHERS AT Green-eyed Motors: https://www.greeneyedmotors.com/

Modified from Courtesy Jim Smith

What Are You Waiting For?

Electrics Cars Are:

* Powerful & Safe
* Cheap to Operate
* Even Cheaper to Maintain
* Drive Train Warranteed for up to 8 Years
* Can Be Fueled for Free at Home or Work and on Long Trips
* Will Have Great Resale Value

Courtesy Jim Smith

We can Invest in Solar Panels or Community Solar

- AN INVESTMENT - Here's why:
  - A personal story
    - **SPENT:**
      - **$30,000 (minus 30% fed credit) for 30 panels (rounding out cost)**
    - **RETURN:**
      - **Saved $1000 in electricity for 1 year**
      - **With my Leaf – powered by solar panels I drove 14,000 miles replacing a car 25mpg say $2.50 / gallon = i.e. I did NOT spend $1,400 on gasoline**
      - **RETURN $2,400 in ONE year on $30,000 investment! = 8%**
      - **RETURN WITH 30% FED TAX CREDIT = 11.4%**

Buy and Electric Vehicle (EV)

- 100 mpg equivalent
- Batteries > 100,000 miles
- Motor 1,000,000 miles
- No oil change EVER
- No maintenance
- Why Gasoline Powered Cars Are Obsolete - Jim Smith https://www.youtube.com/watch?v=d7tRlsoZgdI

EVs
no Emissions

Steve Stevens with Tesla X
90 kWh = 300 mile range

Paul Belanger & Phil Nelson with their Nissan Leafs
30 kWh = 107 mile range

Ron Larson with Tesla S
75 kWh = 250 mile range

BREATHE EASY:
COAL is not coming back
Renewables win!

- **RENEWABLES are cheaper!**
  - **Wind especially**
  - **PV next – but will become even cheaper**
  - **Battery backup**
  - **Concentrated Solar Power for Thermal backup**

http://www.coloradoindependent.com/164687/bill-ritter-colorado-clean-energy-trump-coal

Imagining a World After Fossil Fuels

- 

https://www.stratfor.com/weekly/imagining-world-after-fossil-fuels

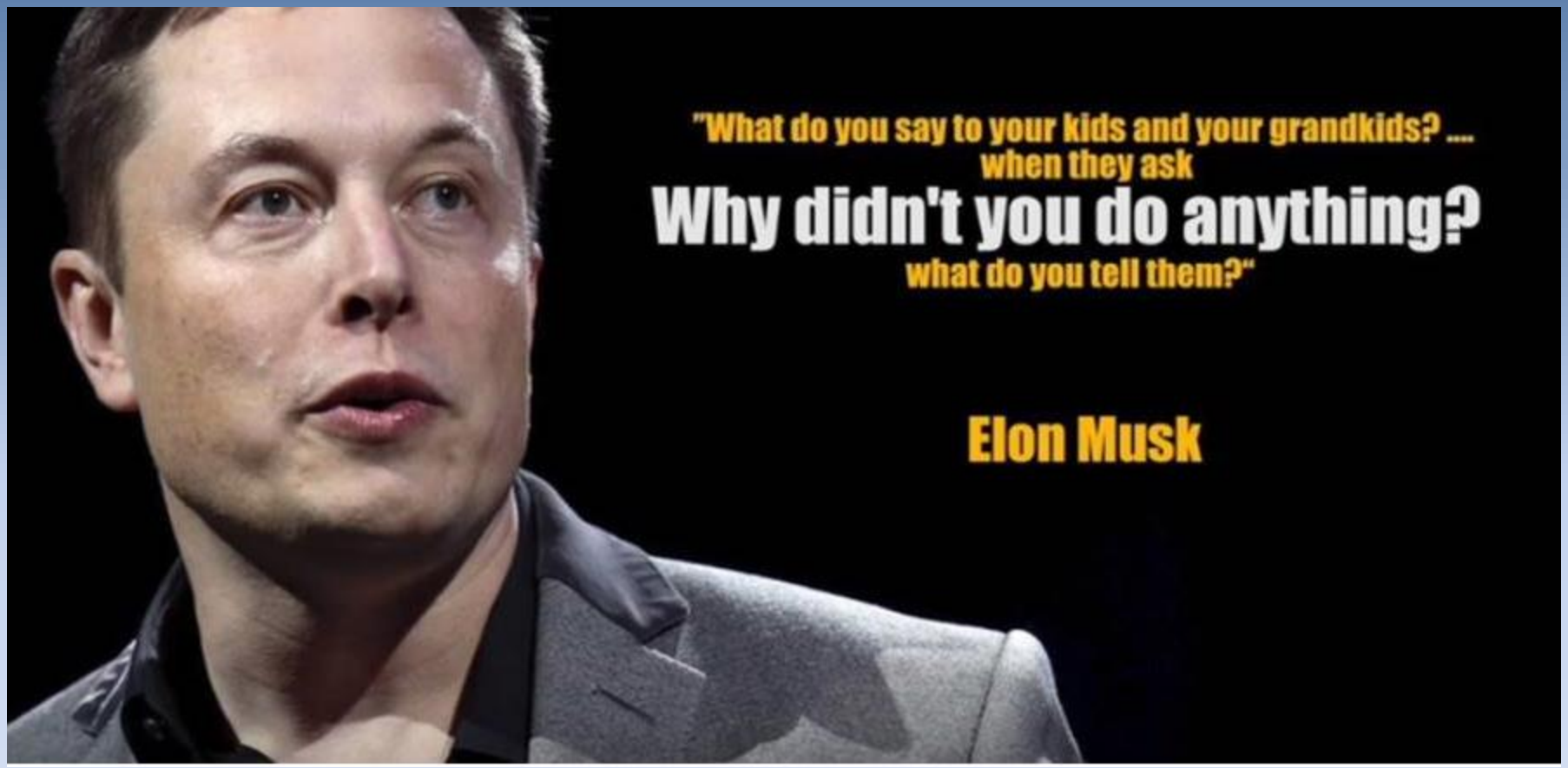
OLLI WEST – POSSIBLE COURSE I AM DEVELOPING

- Entitled: **Understanding Man-Made Climate Change; How and Why We Need to Decarbonize Our Energy Sources, Sequester Carbon and How it is Being Done.**
- …now how to make the title shorter?

IT'S ALL A CONSPIRACY, EH?

HOW DOES ONE COMMUNICATE SCIENCE?

I’m trying!


"What do you say to your kids and your grandkids? ....
when they ask
Why didn't you do anything?
what do you tell them?"
Elon Musk

What if?

Joel Pett

My contact info

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http://denverclimatestudygroup.com/

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