

# GLOBAL ENERGY AND ECONOMIC PLANS

HONR 229L: Climate Change: Science, Economics, and Governance

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<http://www.atmos.umd.edu/~rjs/class/honr229L>

## Global Energy and Economic Plans



UNIVERSITY OF MARYLAND  
HONORS COLLEGE

**5 December 2019**

# GLOBAL ENERGY AND ECONOMIC PLANS

## Schedule

**12:30 to 12:40 Welcome, Class Overview, and Treaty Background**

**12:40 to 12:50 International Agreement: Negotiators**

**12:50 to 1:00 Economic & Energy Plan, Developed World**

**1:00 to 1:10 Economic & Energy Plan, China**

**1:10 to 1:20 Economic & Energy Plan, Developing World**

**1:20 to 1:34 QA with panel of Judges**

**1:35 to 1:45 QA with Audience**

**1:45 Judge's Decision**

# GLOBAL ENERGY AND ECONOMIC PLANS

Formal presentation before public audience and an esteemed panel of judges:

Greta	HONR 229L, class of Fall 2015
Madison	HONR 229L, class of Fall 2018
Sarah	HONR 229L, class of Fall 2018

Judges will decide which team “did best” based upon:

1. The efficacy of their economic and energy plans
2. Did the group give up too much or too little in the negotiation

# GLOBAL ENERGY AND ECONOMIC PLANS

## Organization

3 groups representing **China, India & Africa**, and the **U.S. & Europe** conducted a negotiation to limit global warming to 1.5°C above pre-industrial

Within each group:

President

Three Member Senate

Minister of Energy

Minister of Economics

Negotiator

Negotiators produced International Treaty

Ministers produced of Energy & Economic Plans

Each document required Senate approval & Presidential signature

We organized project just before Thanksgiving and completed work on the project during four class meetings since Thanksgiving

# GLOBAL ENERGY AND ECONOMIC PLANS

China:

President: Peter

3 Member Senate: Aaron, Cristy, & Emma

Economic Minister: Sijing

Energy Minister: Thomas

Negotiator: Ammar



**Channel the energy & vision of President Xi**

# GLOBAL ENERGY AND ECONOMIC PLANS

US & Europe:

President: Edison

3 Member Senate: Anne, Ryan, Rhea

Economic Minister: Eric

Energy Minister: Luke

Negotiator: Nyah



**Channel the voice of America's Pledge**

# GLOBAL ENERGY AND ECONOMIC PLANS

India & Africa:

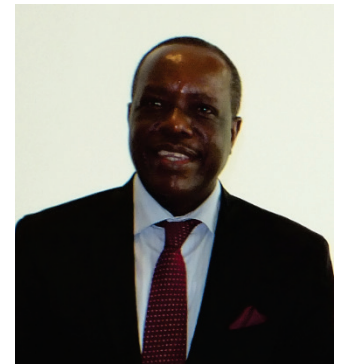
President: Hillary

3 Member Senate: Anna, Abhay, Eliza

Economic Minister: Michelle

Energy Minister: Amanda

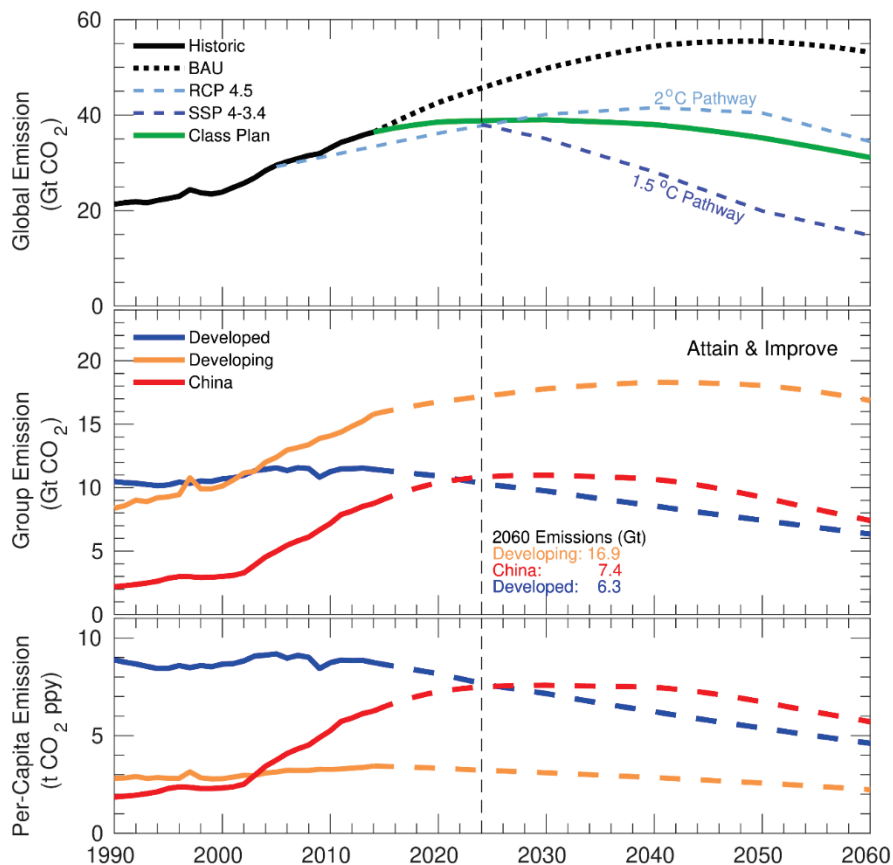
Negotiator: Sam



**Channel the courage & wisdom of Dr. Sunita Narain  
and Energy Minister Sospeter Muhongo**

# GLOBAL ENERGY AND ECONOMIC PLANS

Emission pathway for complete adherence to commitments to Paris Climate Agreement coupled with continued improvement in the carbon intensity of nation's economies (i.e., Attain & Improve) such that 50% (Developing & China) and 55% (Developed World) of all energy will be achieved without atmospheric release of GHGs







# **The Lomé Initiative**

Togo, Nigeria, India, China, United States, The Nations of Europe

# Our Mission

- *Find common ground on which the nations of the world can stand against climate change.*
- *Cooperate through this international treaty to ensure members of the treaty are able to maintain and improve RCP 4.5 emission standards.*
- *Preserve the planet on which we all live.*



<https://www.thegirlandthefig.com/post/happy-earth-day>



<https://s3.envato.com/files/174337883/preview.jpg>

# Trade Deal

To ensure a technology transfer between developed and developing nations

2 separate 20-year investment plans of \$500 billion

## **China**

Use their investment to  
build up hydropower,  
solar, wind, and biofuel  
developments  
in India

## **U.S. & Europe**

Use their investment to  
build up nuclear and  
renewable energy  
in Africa

# Trade Deal (cont.)

In return India and the nations within Africa will lower the profit margins of exported lithium and exclusively to exported minerals used in producing environmentally friendly forms of energy to participating nations.

## **India and Africa**

20 % reduction in profit margins of lithium exported

Apply at a negotiable percentage to other minerals exported

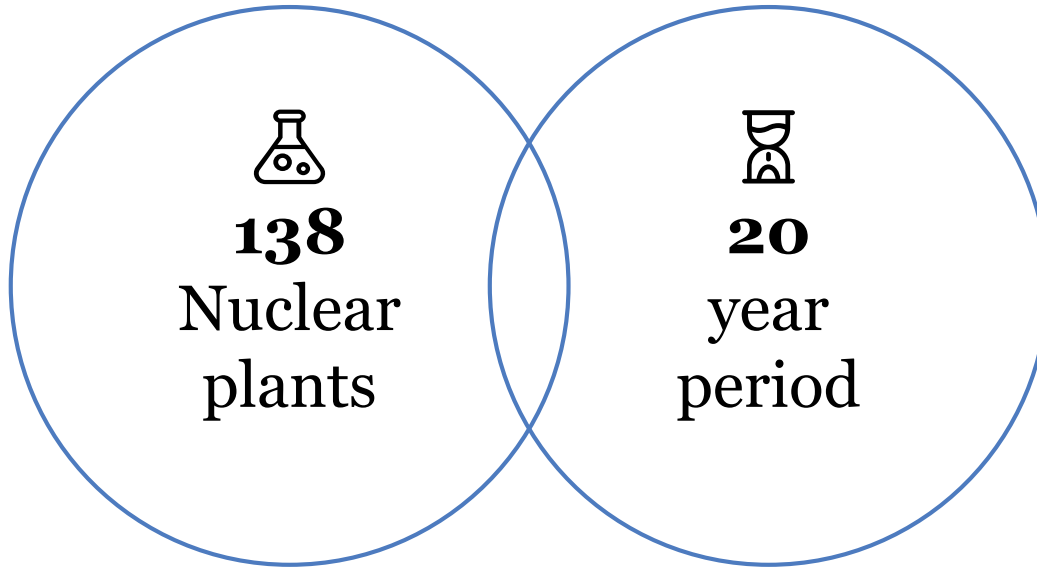
## **China, U.S. & Europe**

No restriction on the use of lithium.

The other minerals exported must be used in the production of eco. Friendly energy

# Trade Deal (cont.)

China will buy nuclear technology from the U.S. and Europe



# Visual Explanation



<https://sites.psu.edu/civicbloglexie/files/2016/04/us-china1.jpg>



[https://s3.ap-south-1.amazonaws.com/hansindia-bucket/7683\\_Indo\\_African.jpg](https://s3.ap-south-1.amazonaws.com/hansindia-bucket/7683_Indo_African.jpg)

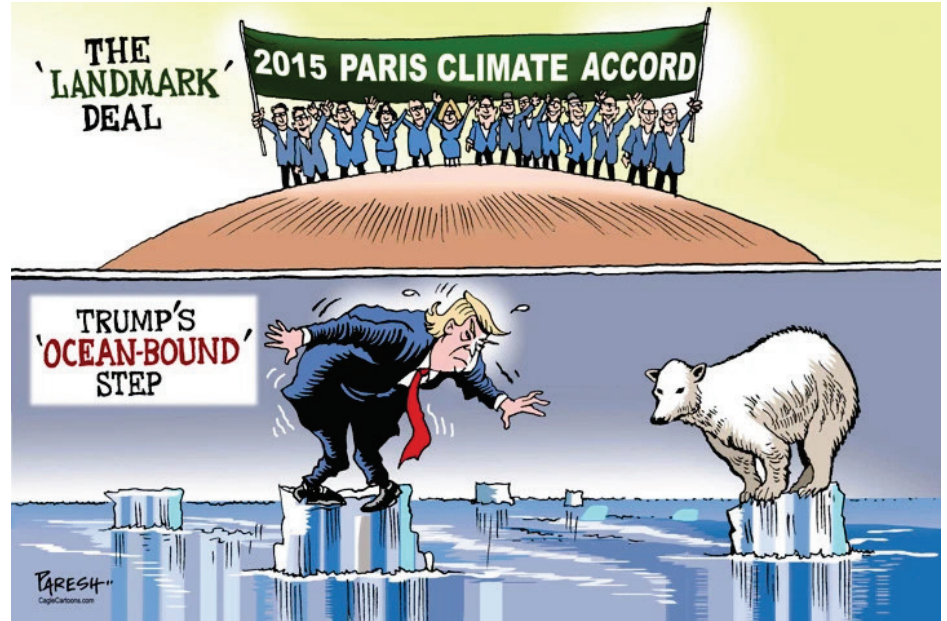
[https://i0.wp.com/www.mobileworldlive.com/wp-content/uploads/2018/12/shutterstock\\_657309646.png?fit=650%2C500&ssl=1](https://i0.wp.com/www.mobileworldlive.com/wp-content/uploads/2018/12/shutterstock_657309646.png?fit=650%2C500&ssl=1)

# Global Recognition

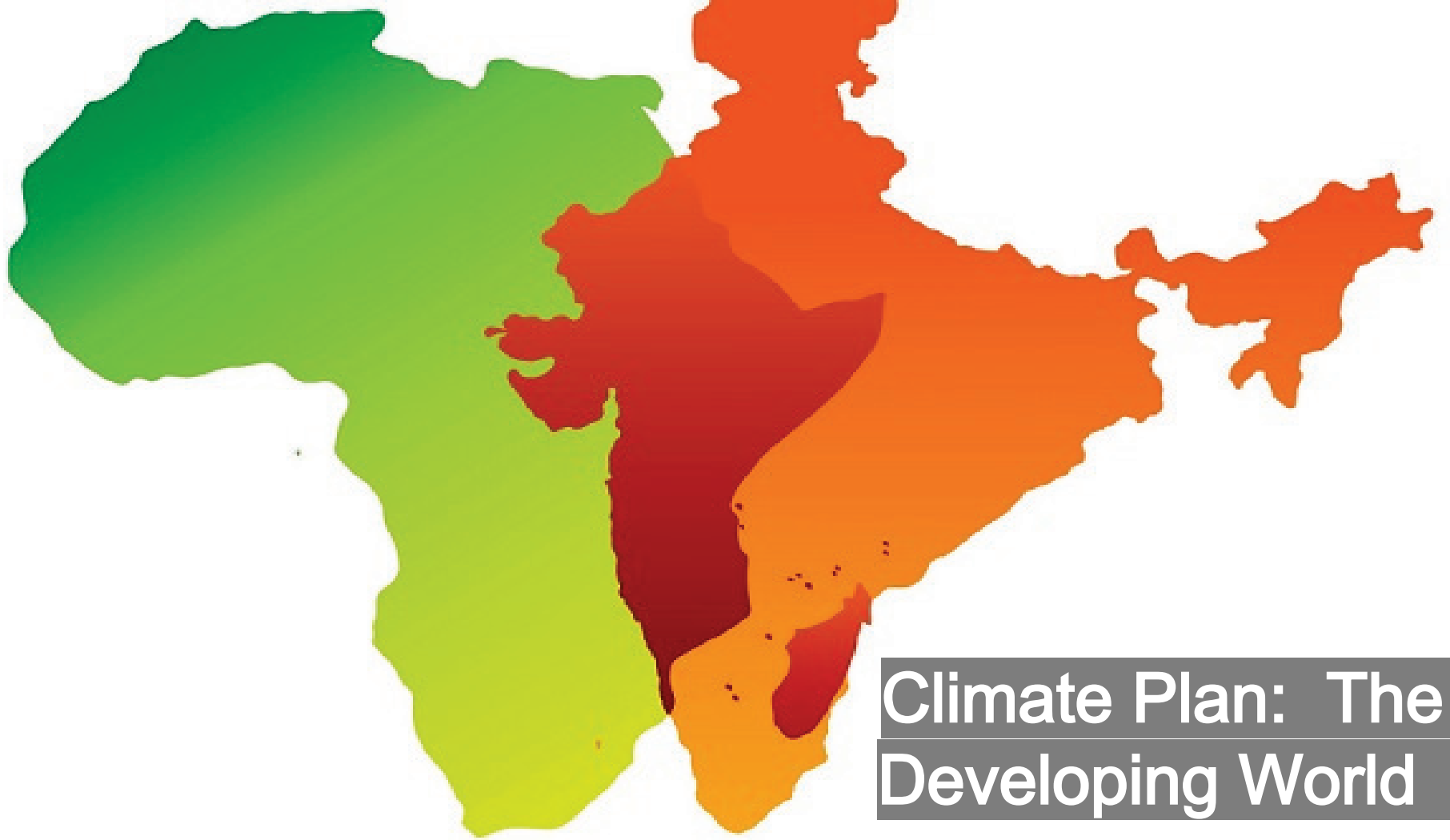
*To encourage a cooperative investment environment...*

- recognition of countries who have made innovative investments
- criteria set low so any nation that invests will be recognized

**Condemns countries who won't join the fight against climate change, as it is a global problem**



<https://images.app.goo.gl/HBuXpPfURNk2WZFs8>



Climate Plan: The  
Developing World



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# Introduction

President: Hillary

Energy Minister: Amanda

Economic Minister: Michelle

Senators: Abhay, Anna, Eliza

Negotiator: Sam

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# Negotiation - Senate Approval

Our goals were to contribute to the actions against climate change while simultaneously building our own economy/infrastructure.

- Improve standard of living
  - Investments allows building of infrastructure
  - Eventually gain ownership of plants
  - Aware of massive potential impact on climate
-

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# Energy Plan



- Algae bioreactors
  - Phasing out fossil fuels
  - Reliance and independence from developing nations
  - Development of renewable energy: Diversification
    - Wind farms
    - Hydropower
    - Solar
  - Grid expansion
  - Nuclear energy
    - Waste storage
-

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# Nuclear

- Location
- Storage



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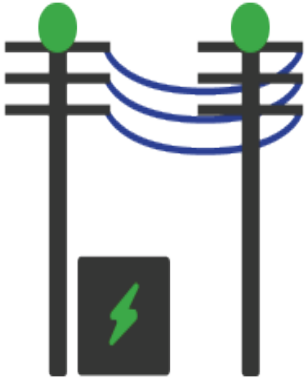
# Energy Plan - Senate Approval

We aim to ensure well-being of peoples in the regions of India and Africa and growth of the economy, while altering energy and economic plans and an international agreement to better the health of the environment on a local and global level.

- Developing renewable energy with existing infrastructure
  - Transitioning, phasing out
  - Independence from contributing developed nations
  - Current and future well-being of peoples
  - Future development
-

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# Economic Plan



African nations and India will do the following:

1. Accept two 20 year periods of economic investment by U.S and Europe, and China
  2. Accept a \$240 million profit for every plant totalling \$500 billion investment
  3. Pay a 5% interest on loans back to U.S and Europe, and China
  4. Take control of all foreign invested energy plants at the end of the agreed timeline
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# Economic Plan - Senate Approval

In order to improve the living conditions of the people in these countries, we strive to have an economic plan that promotes the growth of our own energy infrastructure and allows for the improvement and transition to sustainable energy consumption.

- Foreign aid and investment
  - Transition to economic independence
  - Growth of economy
  - Feasibility and security
-

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# Thank you



*Thank you for your time and consideration of our energy and economic plans. India and the nations of Africa are choosing an optimistic outlook for our future, and we are thrilled to partner with the United States and China.*

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# China



President: Peter

3 Member Senate: Aaron, Cristy, & Emma

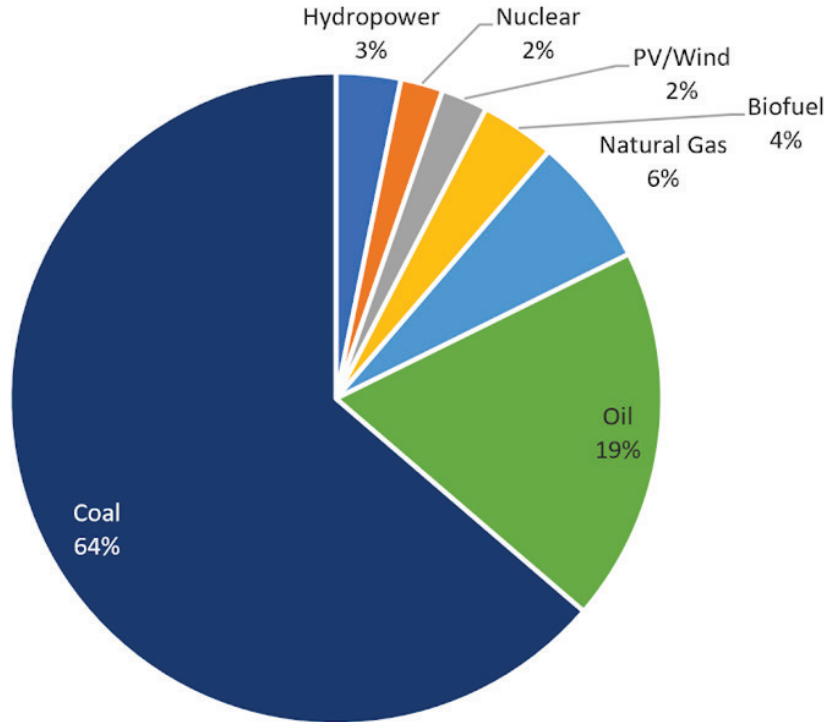
Economic Minister: Sijing

Energy Minister: Thomas

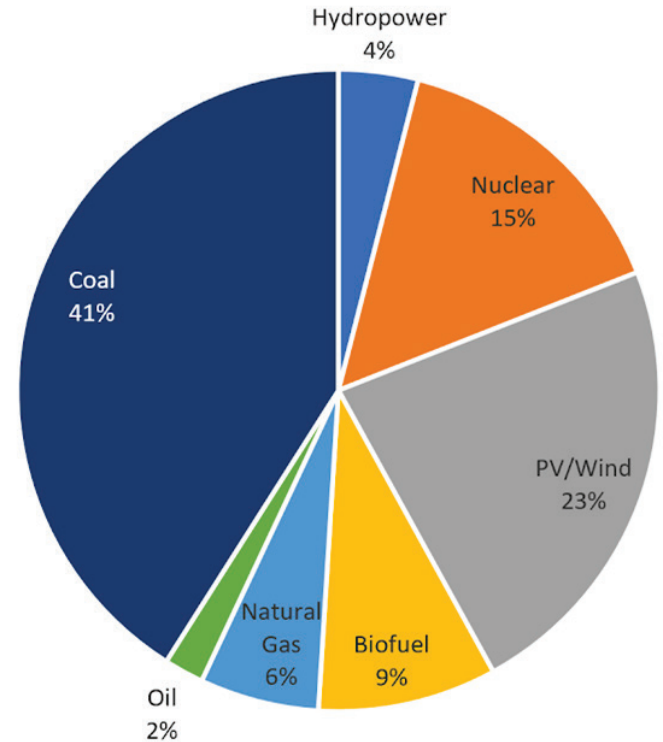
Negotiator: Ammar

# Energy Plan Summary

China: Energy Distribution 2019

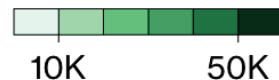


China: Energy Distribution by 2060



# Energy Plan: Transportation

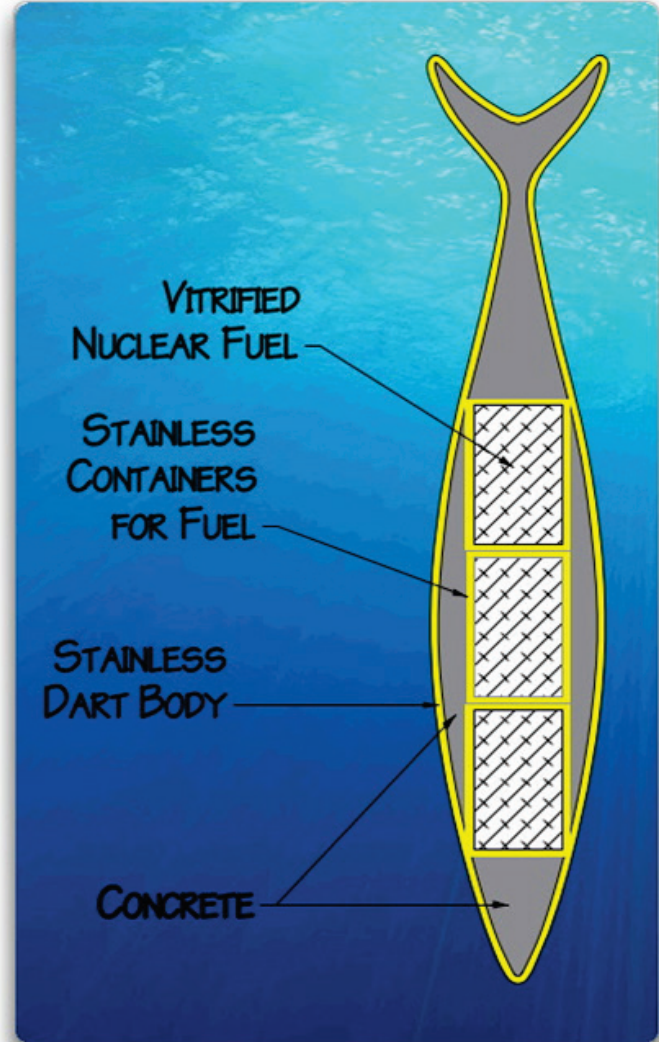
- Replace gas-powered vehicles with electric vehicles
- Boats and cargo containers will run off biofuels
  - Reduce oil consumption from 18.6% to 2%
- Improved air quality
  - Aerosols, nitrogen oxides, sulfur oxides, etc.



Current EV chargers in China, the structure is already in place (Bloomberg, 2019)

# Energy Plan: Nuclear Energy

- Increase nuclear energy use from 2.1% to 15%
- Bought from U.S. or Europe
- Sub-seabed storage of nuclear waste (32°N, 164°W).



# Energy Plan: Solar, Wind, Biofuels



- Increase use of photovoltaics in rural areas
- Wind primarily offshore
- Massive increase in biofuel production for domestic and foreign use

# Economic Plan: Industrial Restructuring

- Carbon tax: \$5 ~10 per ton
- Higher standards: 150% ~ 200% fines for violation
- \$50 billion for energy efficiency program: replacing coal and cleaner coal-fired power plants



<https://www.nytimes.com/2017/06/13/world/asia/china-companies-air-pollution-paris-agreement.html>

# Economic Plan: Alternative Energy Sources

- \$800 billion on alternative energy (wind, photovoltaics, nuclear power plants)
- \$500 billion on biofuel research

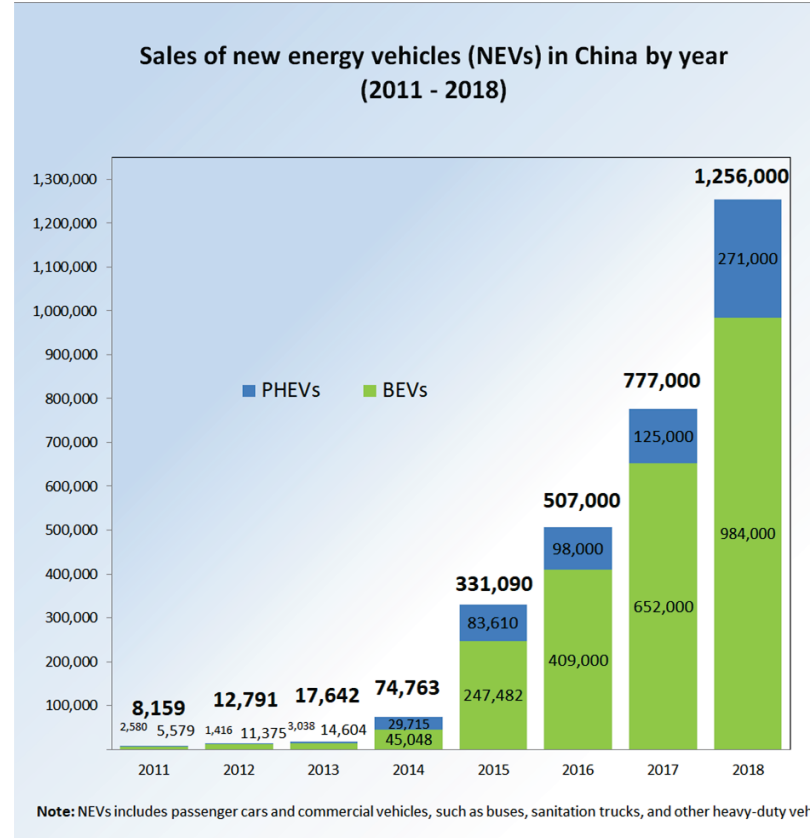


<http://global.chinadaily.com.cn/a/201905/23/WS5ce6079da3104842260bd560.html>

<https://www.bbc.com/news/science-environment-25623400>

# Economic Plan: Transportation

- \$5 billion to build more EV chargers
- Increase subsidies for customers (>55%)
- Gradually replace public vehicles
- Increase taxes for traditional vehicles (more for higher-emission ones)





# Economic Plan: Residential

- Higher construction standards: better insulation performance
- \$30 billion on more efficient household appliances: technology development, subsidies for customers



<https://www.nytimes.com/guides/year-of-living-better/how-to-reduce-your-carbon-footprint>

# Treaty Overview

- Gives best chance at stopping climate change
- China does face more upfront costs but these investments will pay off in the long term
- China will be the world leader in renewable energy and clean transportation for the foreseeable future
- We are encouraged by the cooperation of the World as a whole and believe it will lead to global prosperity

# References

Bloomberg. (2019). China Beats U.S. 8-1 When It Comes to Charging Electric Cars. Retrieved from <https://www.bloomberg.com/news/features/2019-10-15/china-electric-car-chargers-fleet-outpaces-u-s-ev-stations>

China Energy Portal, 2018: <https://chinaenergyportal.org/en/2017-electricity-other-energy-statistics-update-of-june-2018/>

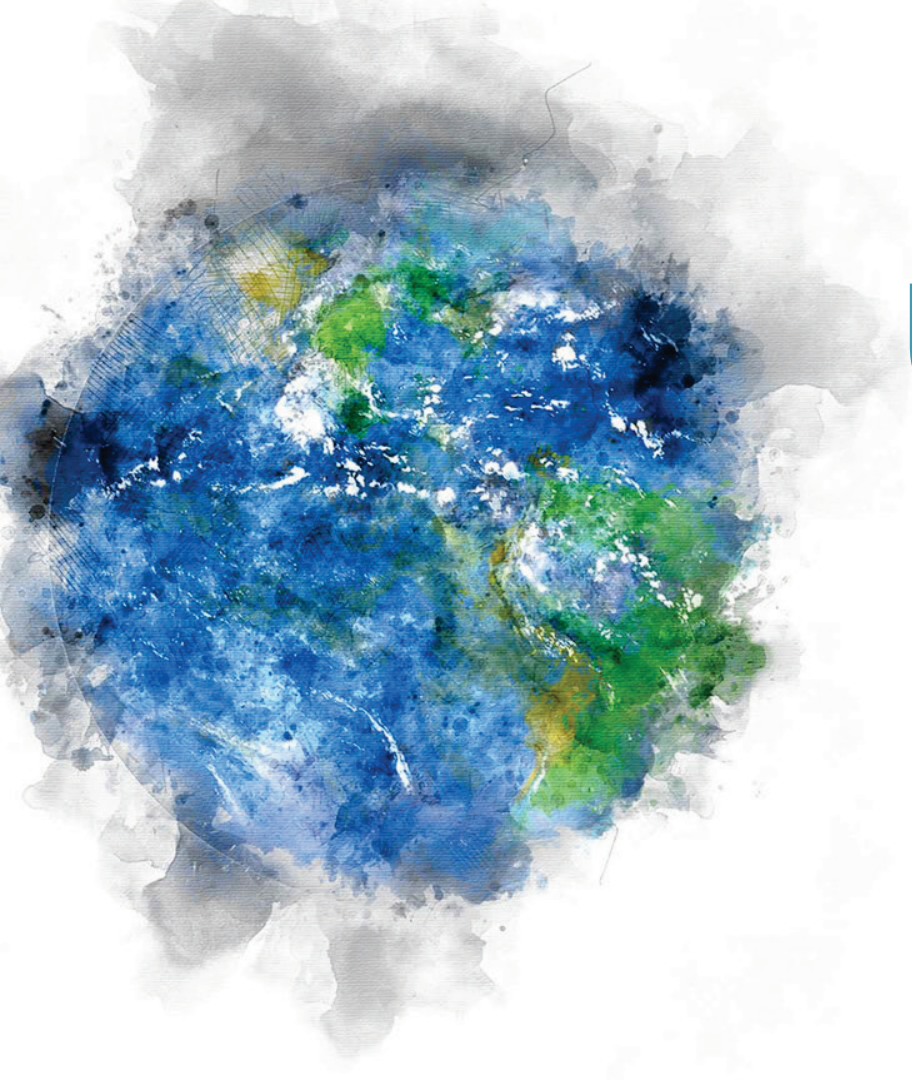
China Power Team, 2019: <https://chinapower.csis.org/china-greenhouse-gas-emissions/>

<https://earthbound.report/2015/08/25/the-sources-of-chinas-carbon-emissions/>

China's 12th five-year plan: [http://www.export.gov.il/UploadFiles/03\\_2012/Chinas12thFive-YearPlan.pdf](http://www.export.gov.il/UploadFiles/03_2012/Chinas12thFive-YearPlan.pdf)

China's 13th five-year plan: <http://www.lse.ac.uk/GranthamInstitute/law/13th-five-year-plan/>

Standards of current subsidies for EVs: <https://www.d1ev.com/activity/butiezhengce.html>



# US and Europe Emissions Reduction Plan

# Positions

- » President: Edison
- » Energy Minister: Luke
- » Economic Minister: Eric
- Senators : Anne, Rhea, Ryan
- Negotiator : Nyah



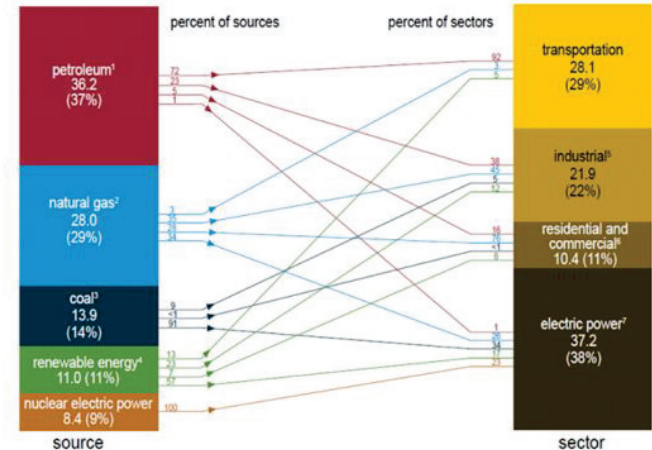
# Overview

- Energy Plan
- Economic Plan
- International Agreement
- Senate Thoughts

## Current Situation

- In 2017:
  - 8.4% of energy consumption from nuclear energy
  - 11% of energy consumption from renewables
  - Of this, 30% from wind and solar
- By 2060:
  - Get to 50% clean energy
  - Raise nuclear energy's share of consumption to 25% by 2060
  - Sixfold increase in wind and solar generation capacity

U.S. primary energy consumption by source and sector, 2017  
Total = 97.7 quadrillion British thermal units (Btu)





## How do we get there?

- Invest massively in nuclear energy
  - Build 75 to 90 new nuclear reactors
  - Research new technology, such as thorium and breeder reactors
  - Waste disposal: Yucca Mountain
  - Ideally, binding international treaty regarding disposal will be negotiated later
- 411 new GW of wind energy capacity by 2060
  - Current: >100 GW
- At least 350 new GW of solar energy capacity
  - Current: 70 GW
  - Projected to double within 5 years
- Subsidize electric vehicles
- Implement and expand 45Q tax credit



# Economic Plan

- **\$1.5 trillion** investment over the next 20 years
  - **Nuclear:** 75- 90 new reactors
    - \$ 8 billion/1,000 MW reactor - > \$ 700 billion
  - **Renewables**
    - **Solar:** \$ 1 million/MW - > \$ 350 billion
    - **Wind:** ~\$ 1,400/kW - > \$ 440 billion
- **\$1.5 trillion** in carbon tax revenue per decade
  - \$ 49/metric ton of carbon for the first decade
  - \$ 70/metric ton for the second decade
- **\$13.5 billion/year** in expanded renewable energy subsidy
  - Currently \$ 20 billion for fossil fuels & \$ 7 billion for renewables annually
  - Will be adjusted to \$ 13.5 billion annually for both fossil fuels and renewables

## Additional Carbon Reduction Incentives

### ➤ 45Q Tax Credit Expansion

- Set to provide \$35/metric ton of recovered carbon emissions in 2024 (currently \$10/metric ton), and \$50/metric ton for CCS
- Our plan expands recovered carbon refund to **\$40/metric ton** (\$50/metric ton for CCS)

### ➤ Electric Vehicle (EV) Tax Credit Expansion

- Currently \$2,500 - \$7,500 per new EV - > **\$10,000 per new EV**



<https://www.cnbc.com/2019/11/22/james-bond-lotus-sports-car-elon-musk-bought-inspired-tesla-cybertruck.html>

# International Agreement

- \$500 Billion - India/Africa
  - \$8 Billion/Nuclear Reactor (~1,000 MW)
  - \$1 Billion- Solar (~1,000 MW)
  - \$1.4 Billion- Wind (~1,000 MW)
  
- Build 45 Nuclear Reactors
  - \$360 Billion
  
- Build ~84,000 MW Solar Capacity
  - \$84 Billion
  
- Build ~40,000 MW Wind Capacity
  - \$56 Billion



A watercolor illustration on the left side of the slide. It depicts two hands, rendered in shades of brown and orange, cupping a mound of dark brown soil. A small, vibrant green plant with several leaves is growing out of the soil. The background behind the hands and soil is a soft, abstract wash of light green and blue watercolor colors.

# Senate Thoughts

- No population plan needed for our nations.
- Unanimous approval of both plans and International Agreement.

Thanks!



