

# The Society of Petroleum Evaluation Engineers

SPEE Denver Chapter announces its April Luncheon Meeting.

(Members and Guests are cordially invited to attend.)

**Wednesday, April 10, 2019**

**Mr. Chris Wright**

CEO of Liberty Oilfield Services



**Will be speaking on:**

**The Intimate Link between Health and Hydrocarbons**

**LUNCHEON STARTS AT 11:30 A.M.**

(A plated lunch will be served.)

**PRESENTATION BEGINS AT NOON**

**The Denver Athletic Club**

**3<sup>rd</sup> Floor, Petroleum Room**

**1325 Glenarm Place (14<sup>th</sup> and Glenarm) Denver CO 80204**

**Parking flat rate \$7.00 on space available basis**

**Cost: \$25.00 per Person**



Sponsored in part by Quorum Software, creators of Mosaic, a comprehensive software application for reserves management, petroleum economics, and decline analysis [www.quorumsoftware.com](http://www.quorumsoftware.com)

**Please RSVP by Noon Monday, April 8, 2019**

**RSVP and simultaneously pay by credit card online at:**

<https://secure.spee.org/civcrm/event/info?reset=1&id=210>

If the above link does not work, alternatively go to [www.spee.org](http://www.spee.org) then select 'Local Chapters', then 'Denver', then 'Register Now'.

**Speaker Bio.: Chris Wright** serves as Chief Executive Officer and Chairman of the Board of Liberty Oilfield Services. Additionally, Chris founded and serves as Executive Chairman of Liberty Resources, a Bakken-focused E&P company and Liberty Midstream Solutions. He has had a lifelong passion for energy and its role in human life. He has spoken on energy to the UK House of Lords, the States Attorneys General, Federal and State Judges, debated the merits of the shale revolution on TV and given over 100 talks.

Chris completed an undergraduate degree in Mechanical Engineering at MIT and graduate work in Electrical Engineering at both UC Berkeley and MIT. Chris founded Pinnacle Technologies and from 1992 - 2006 years served as CEO. Pinnacle created the hydraulic fracture mapping industry by developing and commercializing tiltmeter and microseismic fracture mapping. Pinnacle's innovations in fracturing practices helped launch commercial shale gas production in the late 1990's.

Chris was Chairman of Stroud Energy, an early shale gas producer, prior to its sale to Range Resources in 2006. Chris is a director of TAS (industrial energy technology company), Kerogen Exploration, Liberty Oilfield Services, and Liberty Resources.

Chris has consulted and taught courses on all six inhabited continents and authored / co-authored over 60 technical papers and articles. He has received numerous industry awards and several U.S. patents. Chris also worked on fusion energy, solar energy, and geothermal energy. Chris grew up in Colorado and is a passionate skier, cyclist, climber, and outdoor enthusiast. He serves on the board of numerous nonprofits including PERC, ACE Colorado, ACE Montana, Colorado Academy, PRI, and the YCCF.



**About SPEE:** <http://www.spee.org> SPEE was formed in 1962 as a professional, non-profit organization bringing together specialists in the evaluation of petroleum properties. SPEE continues today to be strongly committed to providing educational and other services to its members and to the oil and gas industry, and to promoting the profession of petroleum evaluation engineering.

**For additional information, please contact:**





**THE INTIMATE LINK  
BETWEEN  
HEALTH  
&  
HYDROCARBONS**



CHRIS WRIGHT  
CEO, LIBERTY OILFIELD SERVICES

Greatest Threat to Humanity & Environment

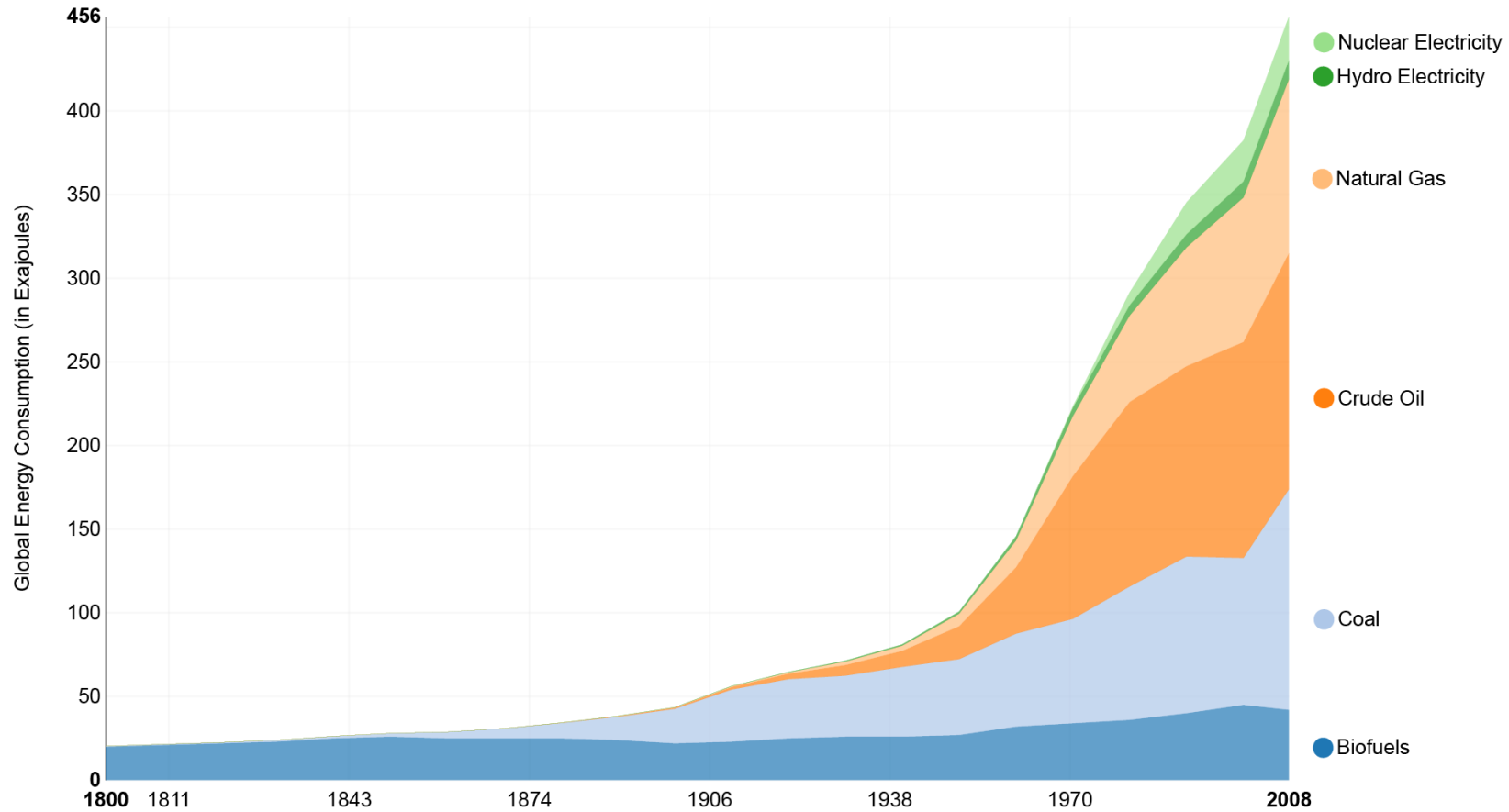
POVERTY

# Energy Use

Over the Last 200 Years

Our World  
in Data

## World Energy Consumption by Source 1800-2000



Data Source: Smil (2010)

Data Visualisation: [www.OurWorldinData.org](http://www.OurWorldinData.org)



# Unprecedented Progress in Human Condition

*Just Over the Last 200 Years*

Liberty  
Property Rights  
Rule of Law

Oil  
Gas  
Coal



# Life Expectancy and Per Capita Energy Consumption



Source: Gapminder





# Coal is Dirty!

*Compared to What?*

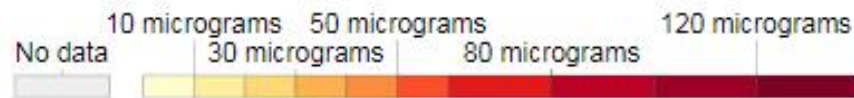
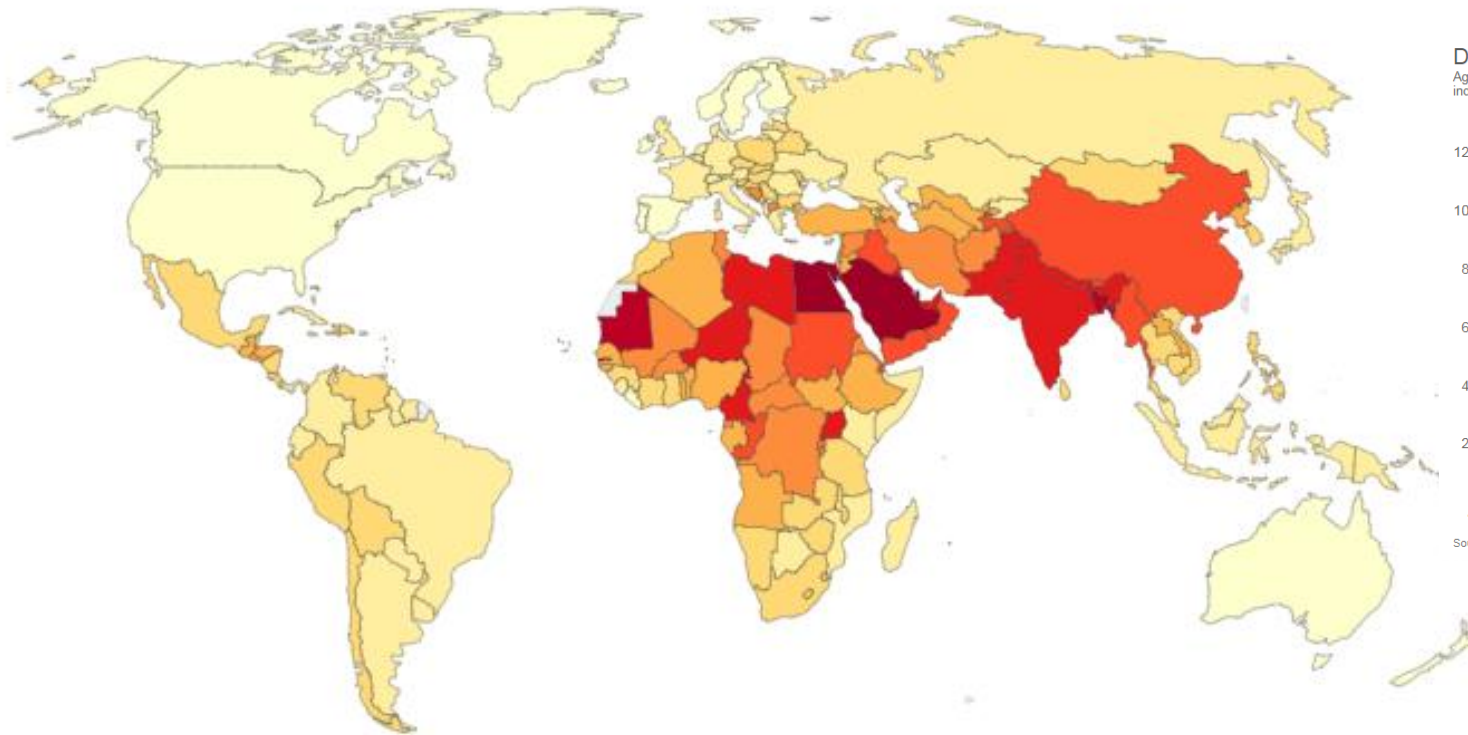




# Particulate Matter Kills – Mostly Poor People

## PM2.5 air pollution, mean annual exposure (micrograms per cubic meter), 2015

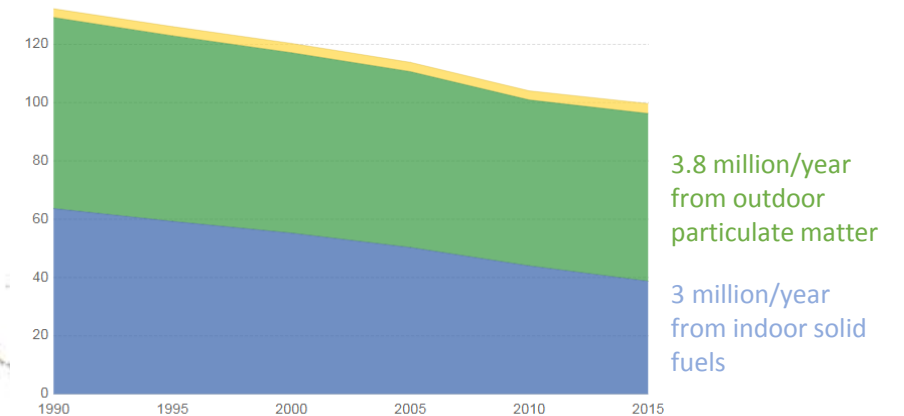
Population-weighted exposure to ambient PM2.5 pollution is defined as the average level of exposure of a population to concentrations of suspended particles measuring less than 2.5 microns in diameter. Exposure is measured in micrograms per cubic metre ( $\mu\text{g}/\text{m}^3$ ).



Source: World Bank – WDI

## Death rate from air pollution per 100,000, World

Age-standardized death rates (differentiated by attribution to ozone, particulates, or indoor fuel pollution) per 100,000 individuals.



Source: IHME, GBD 2016

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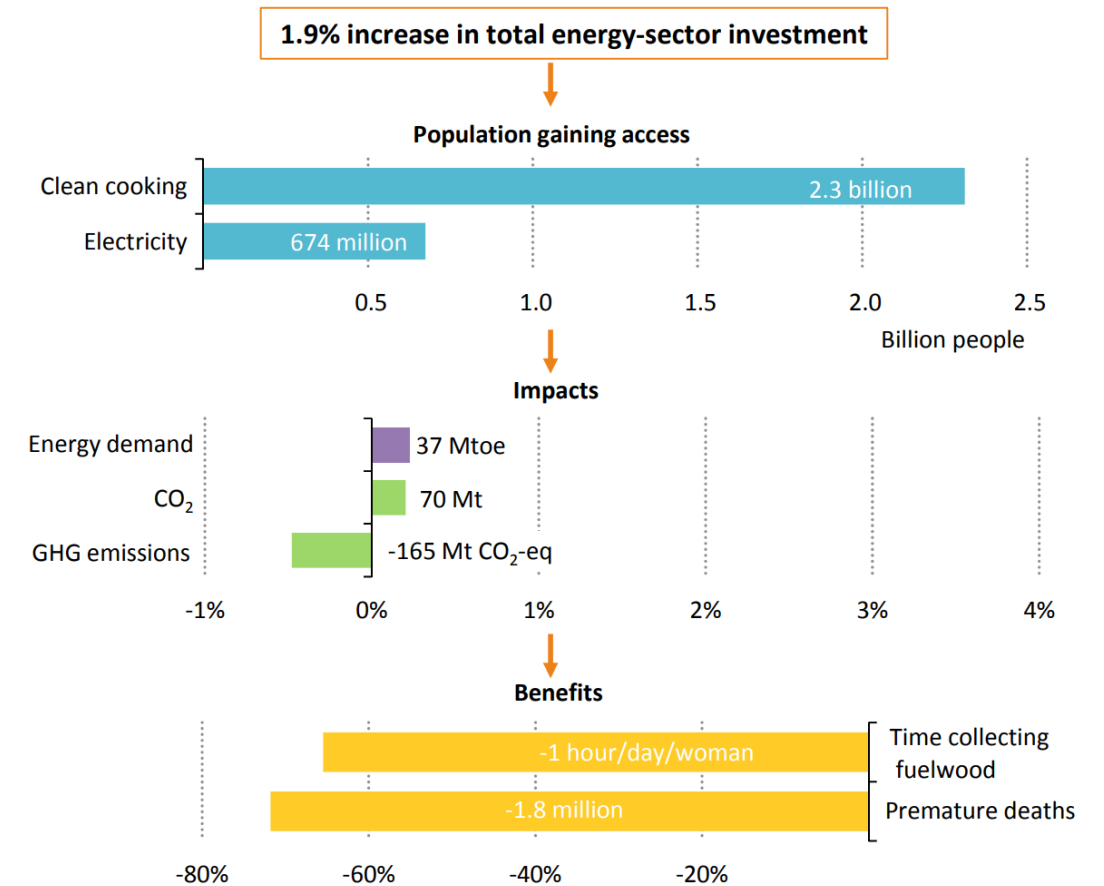
# Poorer Nation's Choices

## Access to Electricity and Clean Cooking

- Can save millions of lives
- Especially improved women's health and living conditions



**Figure 5.4** ▶ Additional impact of the Energy for All Case relative to the New Policies Scenario in 2030



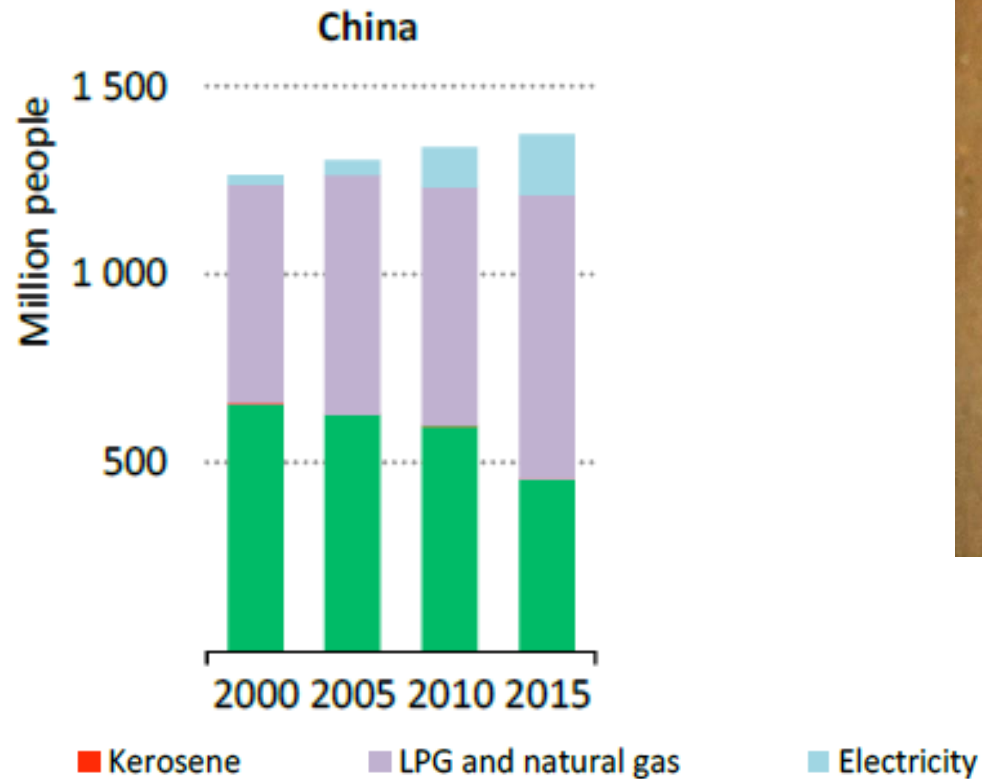
Source: [https://www.iea.org/publications/freepublications/publication/WEO2017SpecialReport\\_EnergyAccessOutlook.pdf](https://www.iea.org/publications/freepublications/publication/WEO2017SpecialReport_EnergyAccessOutlook.pdf)



# Cooking Fuel Improvements in China

## *Exchanging Solid Fuels for Gas*

- 200 million fewer people cook with solid fuel since 2000
- LPG, natural gas and electricity demand have been increasing by around 10% per year





# Many Are Left Behind or Die

Malnourished people:

- 155 million stunted
- 52 million wasting; 17 million severely wasting

Annual deaths:

- 3 million – indoor air pollution
- 4 million – outdoor particulate air pollution
- 7.6 million – malnourishment
- 5 million – lack of access to clean water
- 1.2 million – malaria

Energy poverty is a major driver of these problems.  
Expanded energy access is **ESSENTIAL** to mitigation





# Energy Poverty

- 1 billion people without electricity
- Another billion with only intermittent access
- 2 to 3 billion still cook with biofuels
- Ethanol subsidies steal food from poor people to put into rich people's cars
  - 0.5% of fuel addition for 5% of the world's grain crop
  - Estimated to kill 200,000 people/year (Indur Goklany)

However, Shale Revolution is helping reduce energy poverty:

- U.S. oil production has doubled; oil price cut in half
- Over \$1 trillion yearly wealth transfer from energy producers to consumers. Huge benefit to the poor – and especially poor women
- Natural gas passed coal as #1 source of U.S. electricity



# Energy Poverty – Also in Rich Nations

- 14% of Americans reported receiving disconnection notice for utilities
- 11% of Americans report keeping their homes at unhealthy / unsafe temperature
- CA adjusted poverty has risen to 24% -- highest in US
- CO: 25% of low-income households use wood for heating in San Luis Valley
- Germany's electricity prices ~3x US electricity prices due to focus on renewables
- 65 Britons die every day because they cannot properly heat their home
- Yellow-vest protests in France



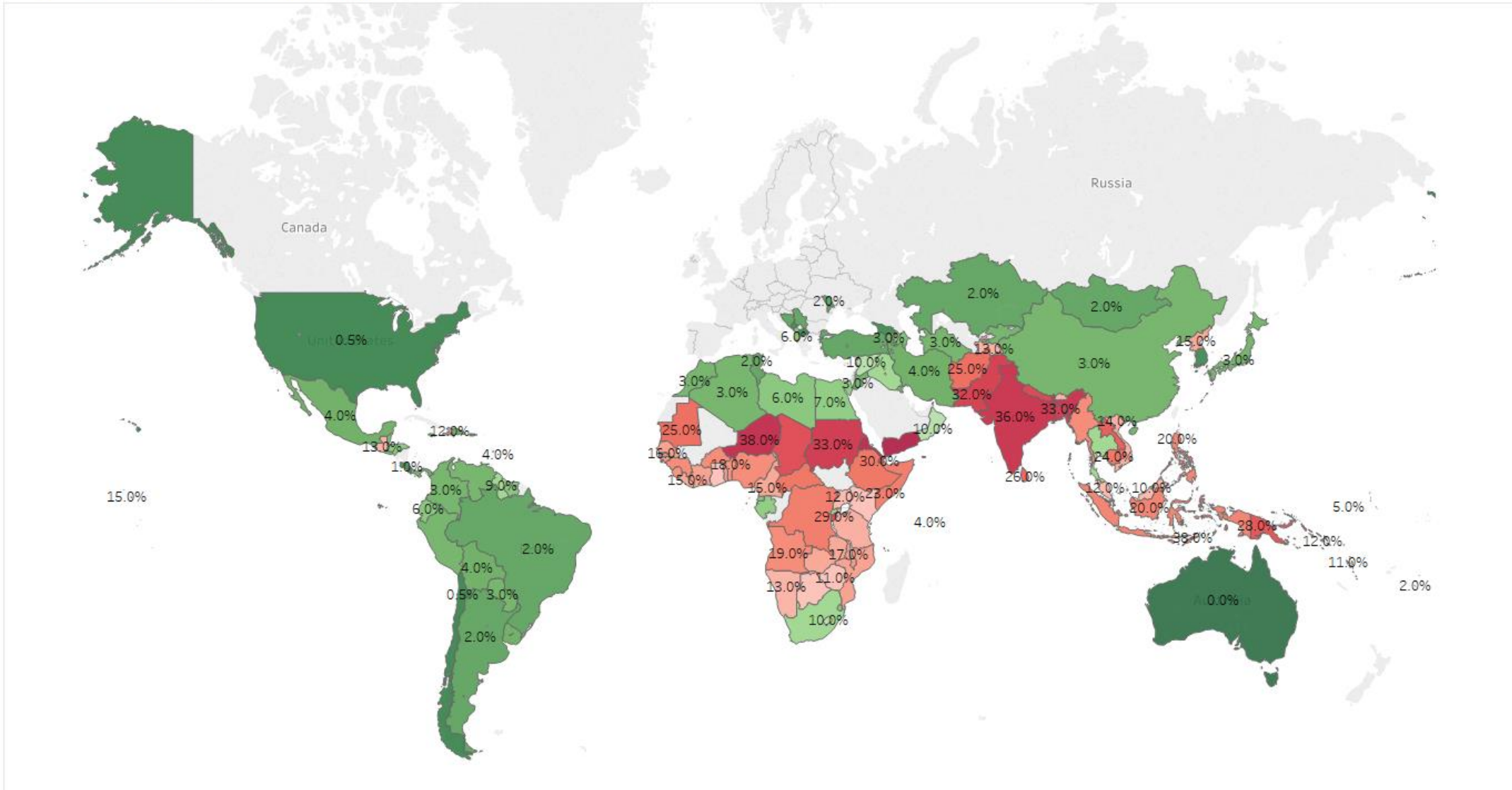




# Electricity Access and Child Malnutrition

*Energy Poverty = Poverty*

% of Children at Age 5 Underweight

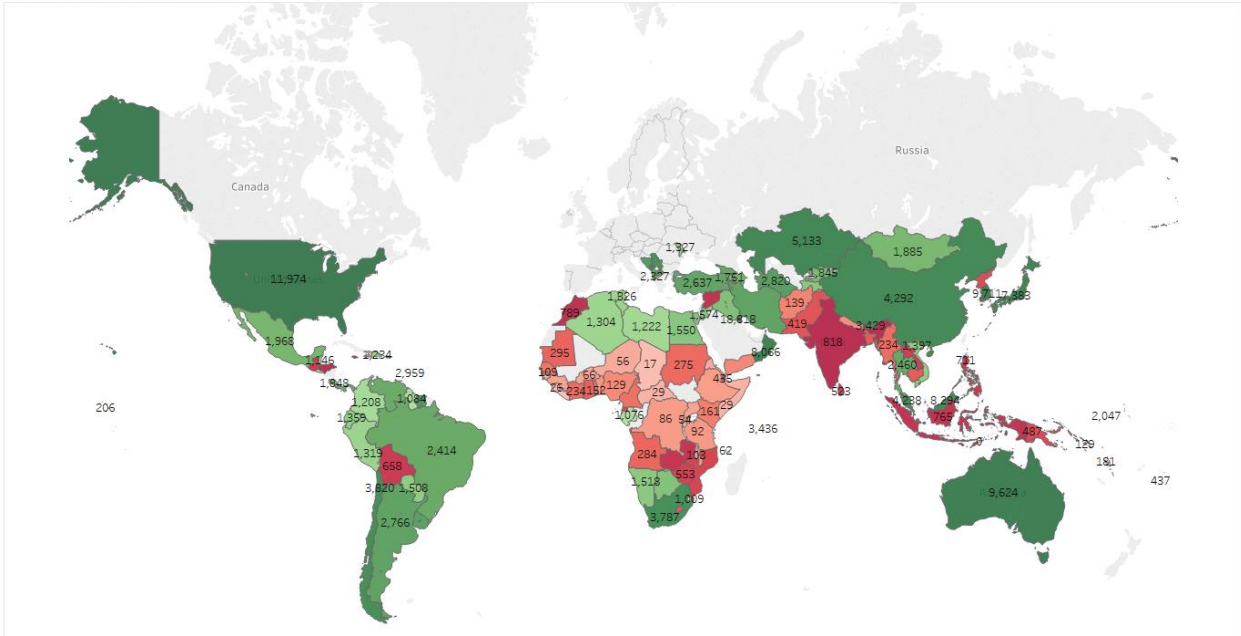




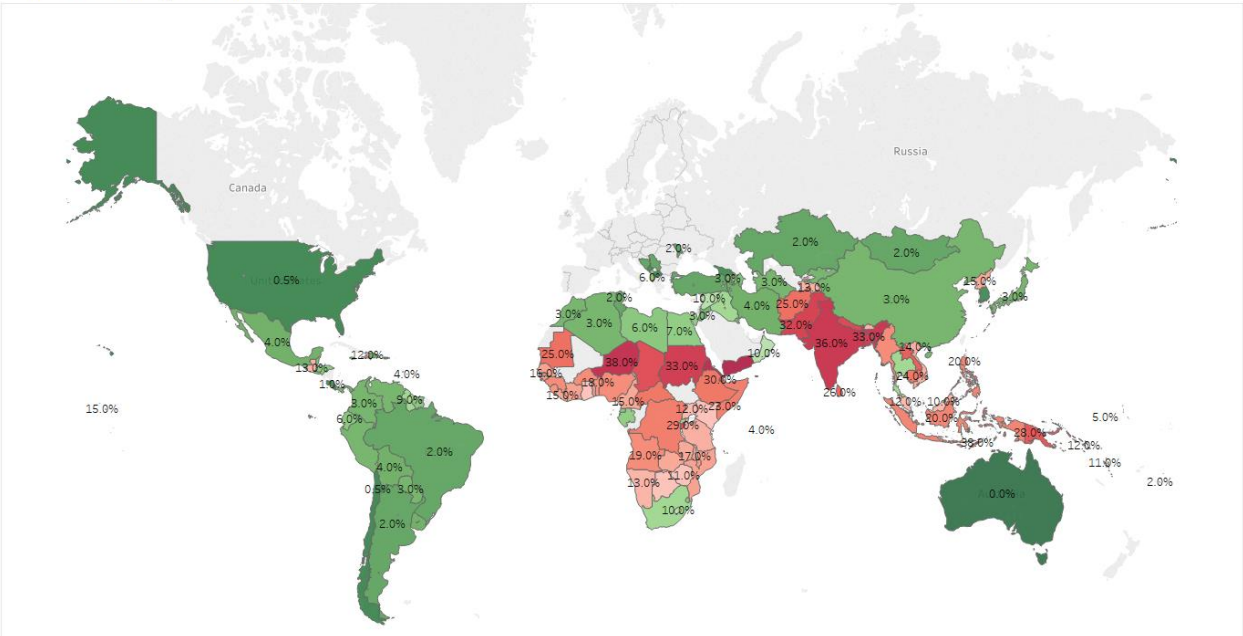
# Electricity Access and Child Malnutrition

*Energy Poverty = Poverty*

Electricity Consumption per Capita (kWh)

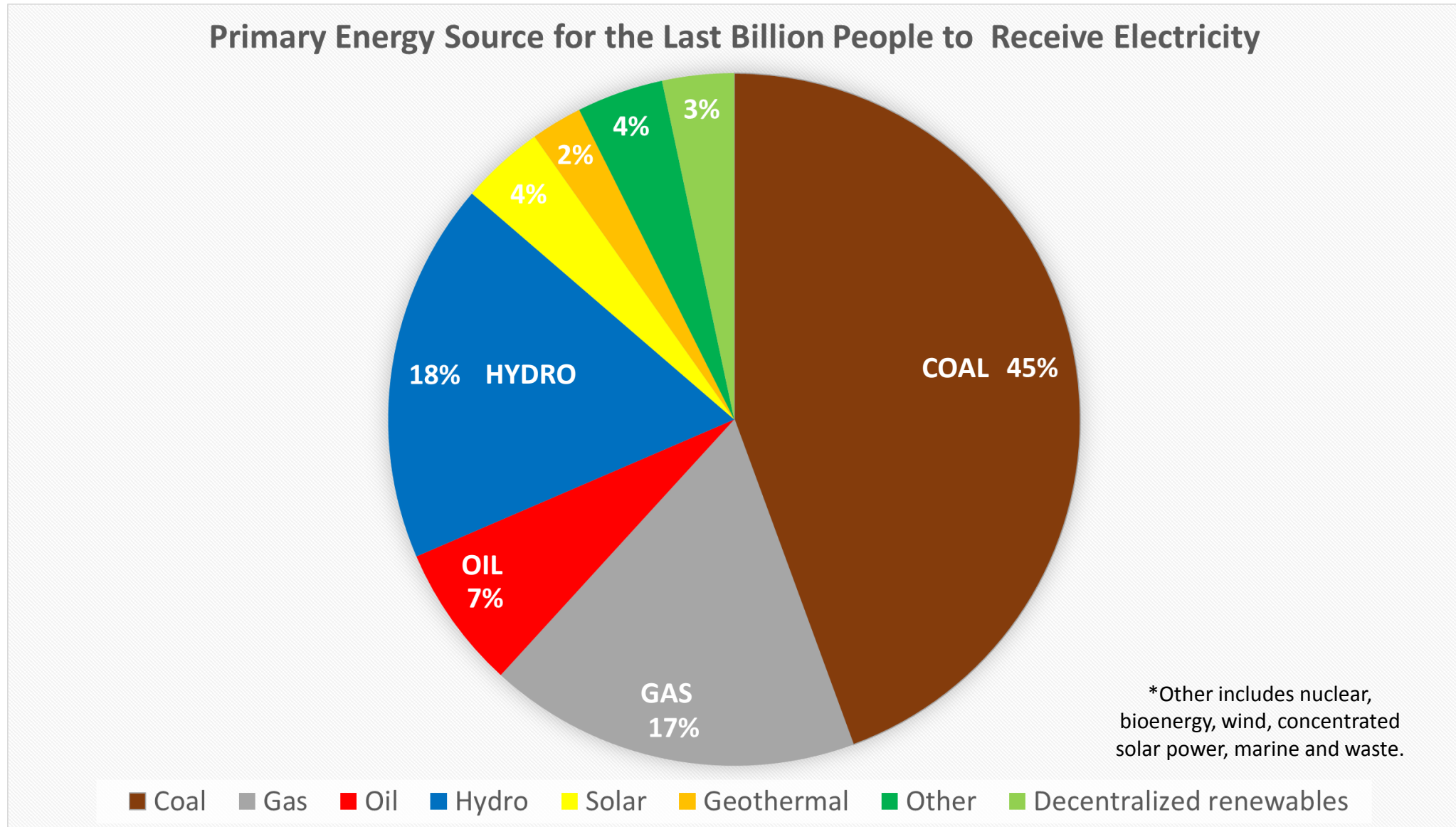


% of Children at Age 5 Underweight



# Where'd the Last Billion People Get Their Electricity?

*Coal is the Workhorse for Access to Electricity*



Source: EIA, 2017





# Hydrocarbons and Poverty

*Energy Access is Enlightening and Green*



## **Dominican Republic**

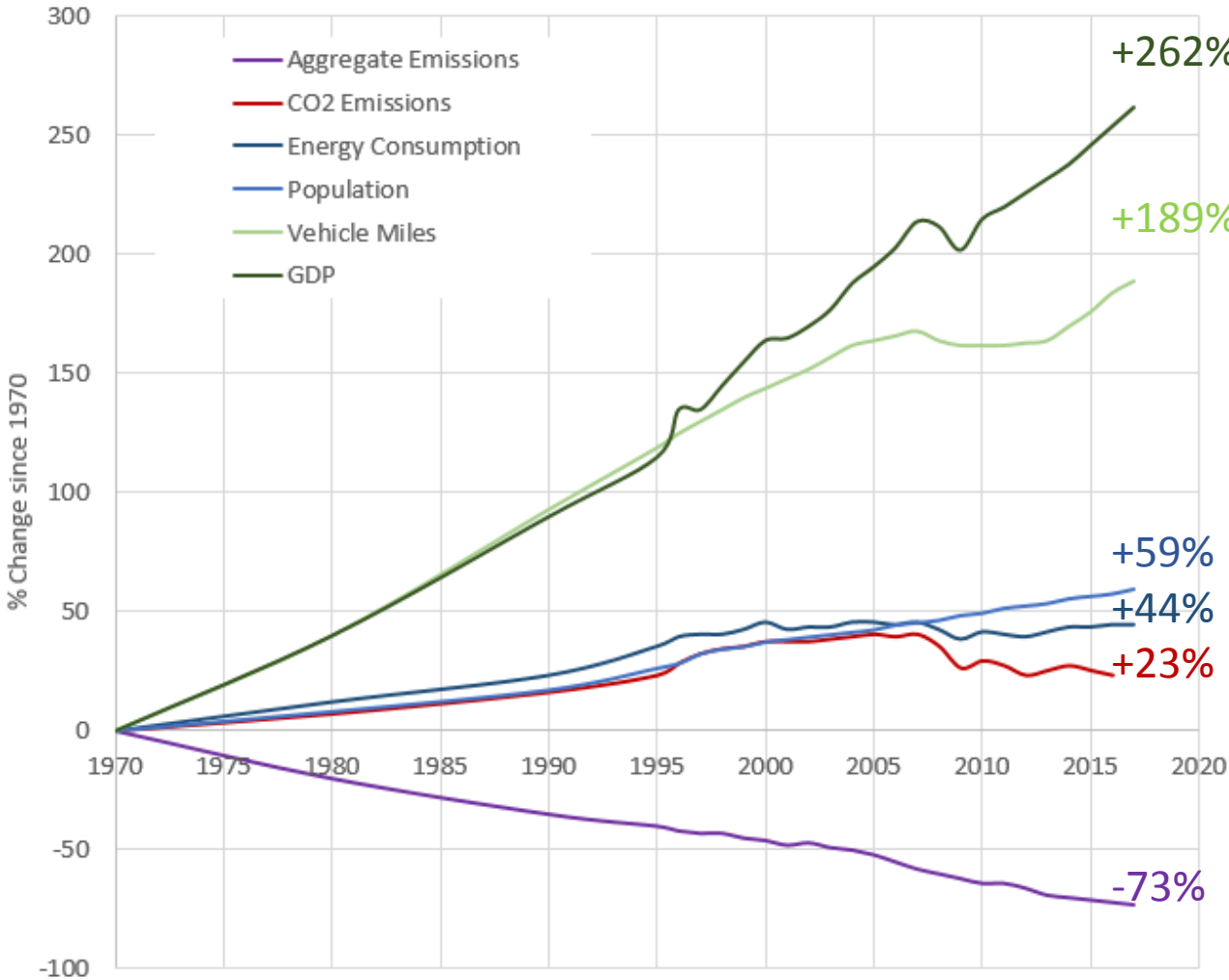
- Robust access to energy
- 7x GDP Per Capita
- 30x Electricity Consumption
- Hydrocarbon Consumption



# Rich Nation's Air Quality – Getting Better All the Time

*While Our Energy Mix between 1970 – Present Remains ~80% Fossil Fuel Based*

## Comparison of Growth Areas and Emissions, 1970-2017



Source: <https://www.epa.gov/air-trends/air-quality-national-summary>





# What About Climate Change?

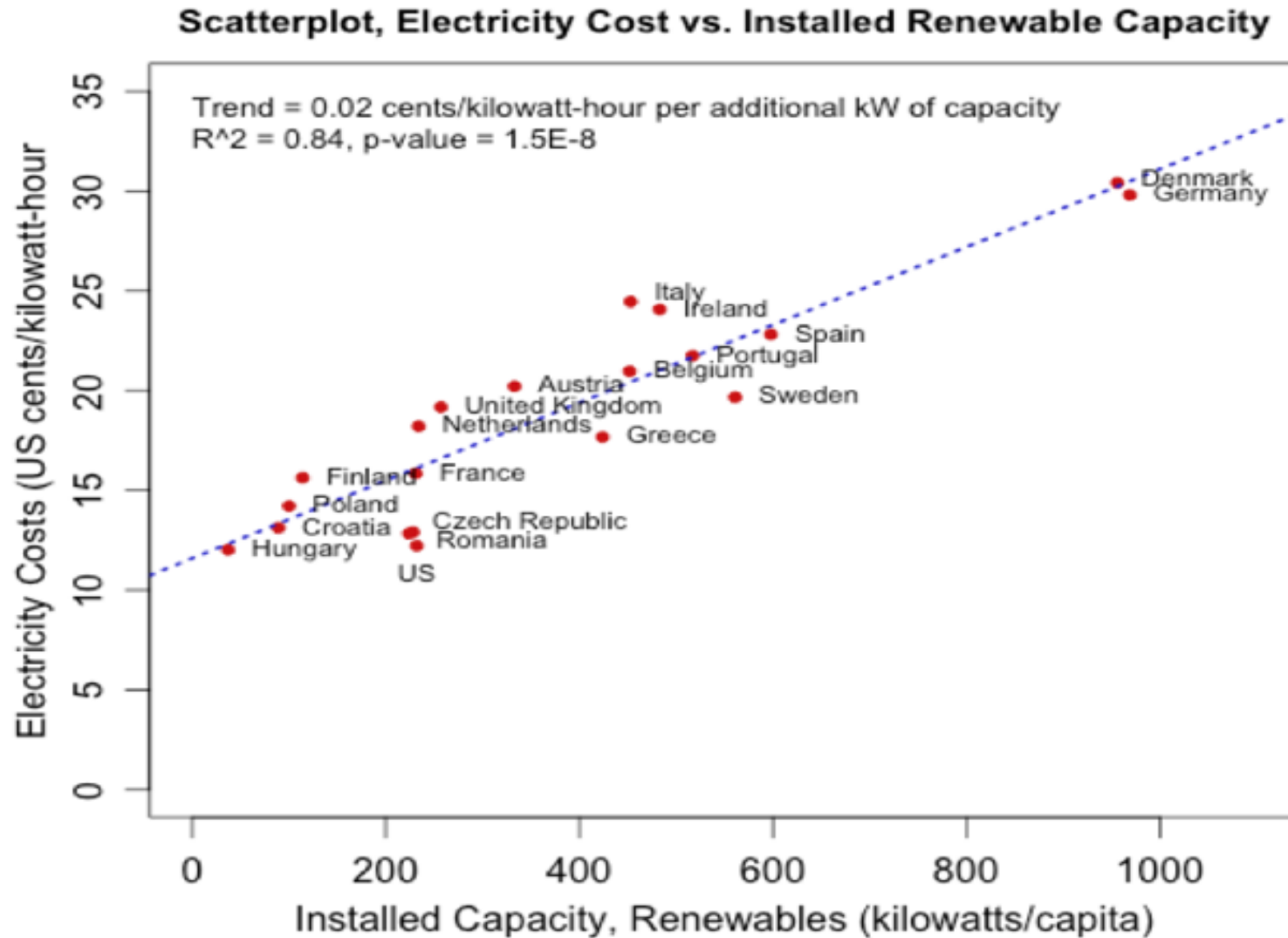
*Reality is A Lot More Positive Than the Media Coverage of the 2018 U.S. Climate Assessment Report*

- U.S. per capita CO<sub>2</sub> emissions are the lowest in 50 years
- Despite media/politicians claims, extreme weather has NOT increased
- IPCC worst case climate scenario: U.S. GDP per capita will more than triple by the end of this century, so a 5% reduction would come from an economy 3X larger than today.
  - Even a 5% reduction in the size of the American economy only follows from picking unlikely worst-case scenarios
- Nobel Laureate Nordhaus shows that ambitious policies like the Paris Agreement target of 3.6°F would cost \$134 trillion, much more than the associated climate benefits. Such prescriptions are worse than the disease.
- Nordhaus has shown that a globally coordinated and gradually increasing carbon tax could cut worse-case temperature rises to 6.3°F from 7.4°F at a cost of \$20 trillion in lost productivity, but more than pay for itself by lowering climate costs.



# Rich Nation's Choices

*Willing to Pay the Higher Energy Bills for Renewables While CO2 Emissions Change Little?*



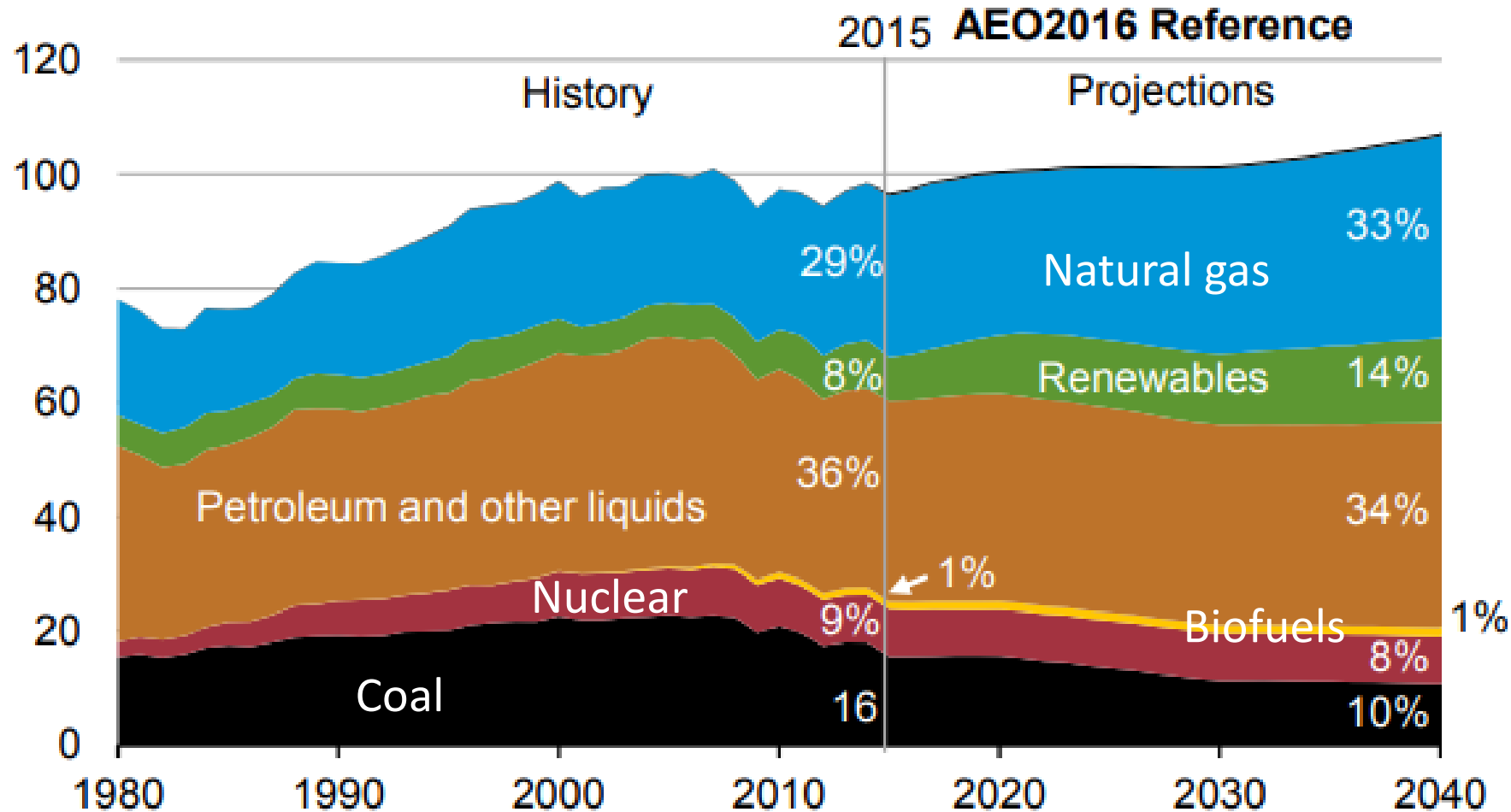
Source: <https://wattsupwiththat.com/2018/12/21/another-look-at-the-fuel-mix/>



# US Energy Consumption

## *Fossil Fuels in the Foreseeable Future*

U.S. primary energy consumption  
quadrillion Btu





# US Energy Production

*A Freedom Dividend from the US to the World*

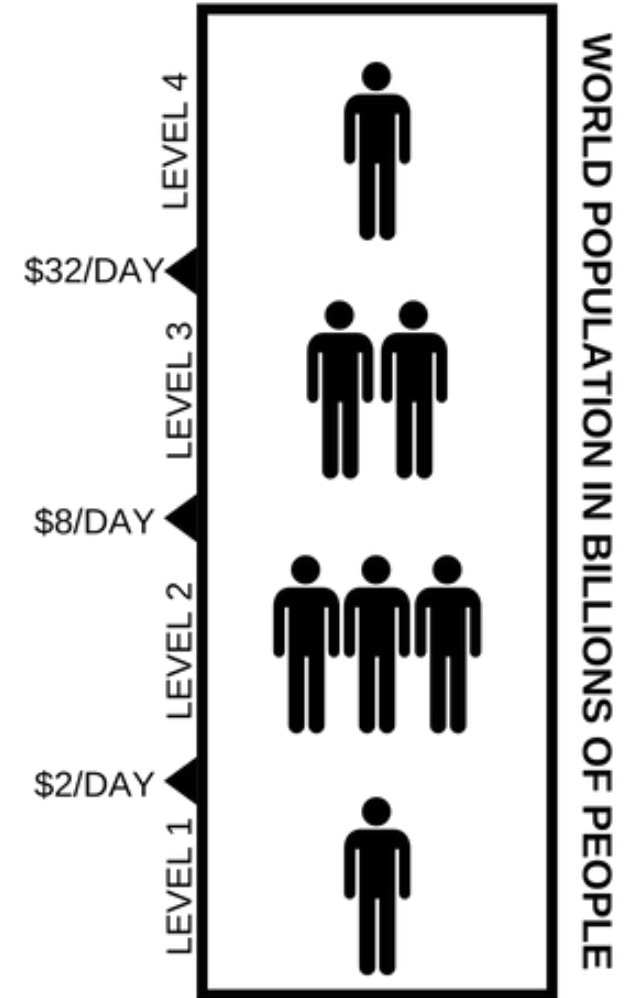
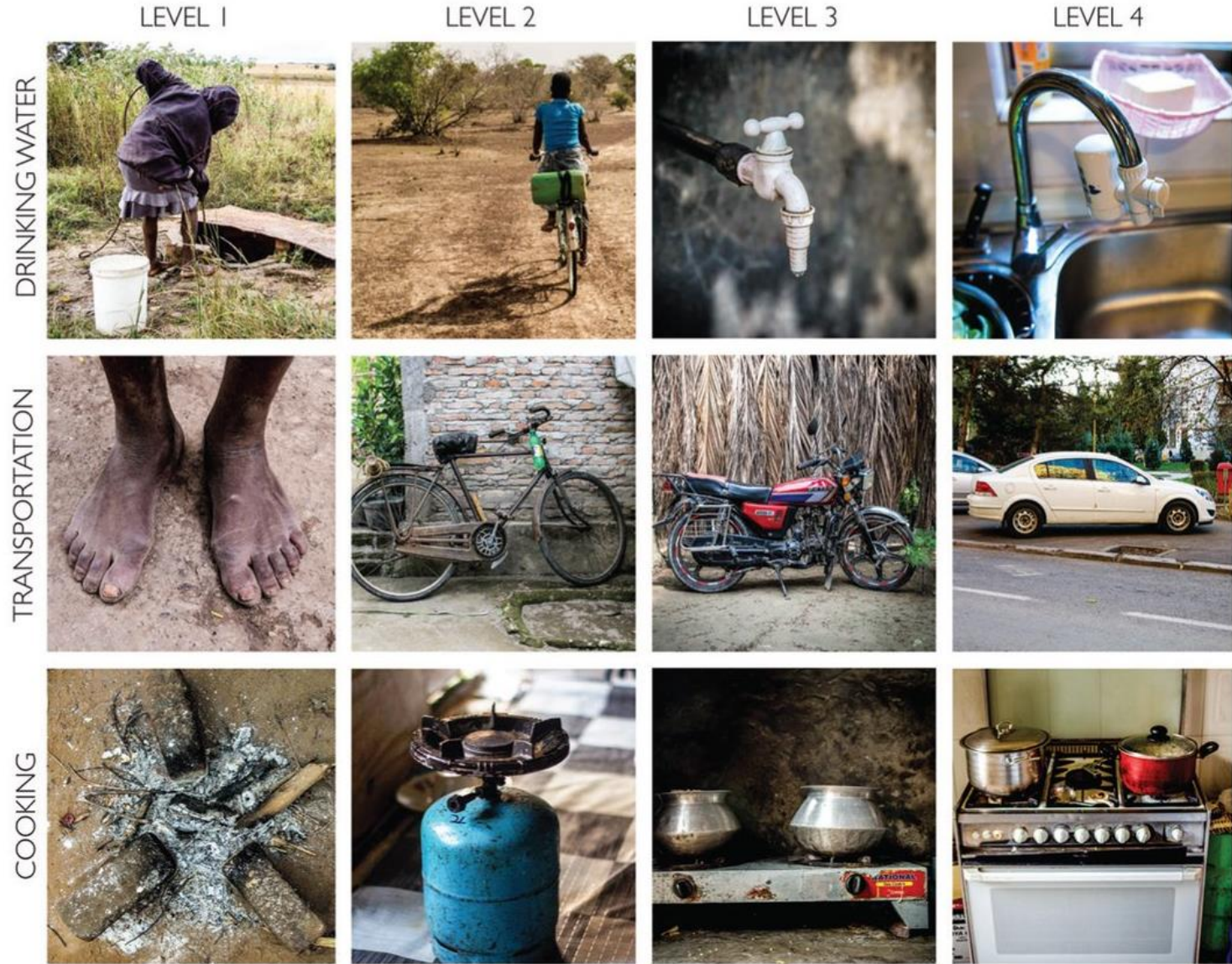
## Gross energy trade (Reference case)

quadrillion British thermal units



# Life on Hans Rosling's Four Income Levels

*Most People Are in the Middle*



Source: Factfulness Gapminder & Dollar Street



# Conclusions

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- The last 200 years have seen unparalleled progress in the human condition
- Over the last 25 years ~130,000 people are lifted from extreme poverty every DAY!
- Further human progress is now facing new headwinds from a myopic – and I believe immoral – focus on climate change
  - The road to hell is paved with good intentions
- Renewable-only push by IMF, WHO and “generous” western governments
  - Leaves ~60 million people in need in the Sahel by blocking access to more-efficient LPG cooking stoves
  - Many people in Niger, fourth poorest country in the world, are forced to keep cooking with “green” firewood
- DO NOT LIMIT people’s energy choices to reduce greenhouse gas emissions – it keeps more people in poverty and harms the environment far more than climate change
- EMPOWER people now with cheap and abundant energy to save lives, forests, air quality, and water quality





***THANK YOU***



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***NYSE: LBRT***

# IPCC's and WHO's False Narrative

*Major Health Concerns Arise from Transportation in the Developed World....?*

Dr. Paunio, epidemiologist and adviser to the Finnish Government, in a recent report:

*“the panel has persuaded the World Health Organization to back the idea that power production and transport in the developed world are major causes of air pollution deaths worldwide.”*

*In reality, [...] **most air pollution harms are found in the developing world, where people have no alternative to burning wood, dung and coal on primitive stoves.**”*

GWPCF: [The Health Benefits of Ignoring the IPCC](#)

