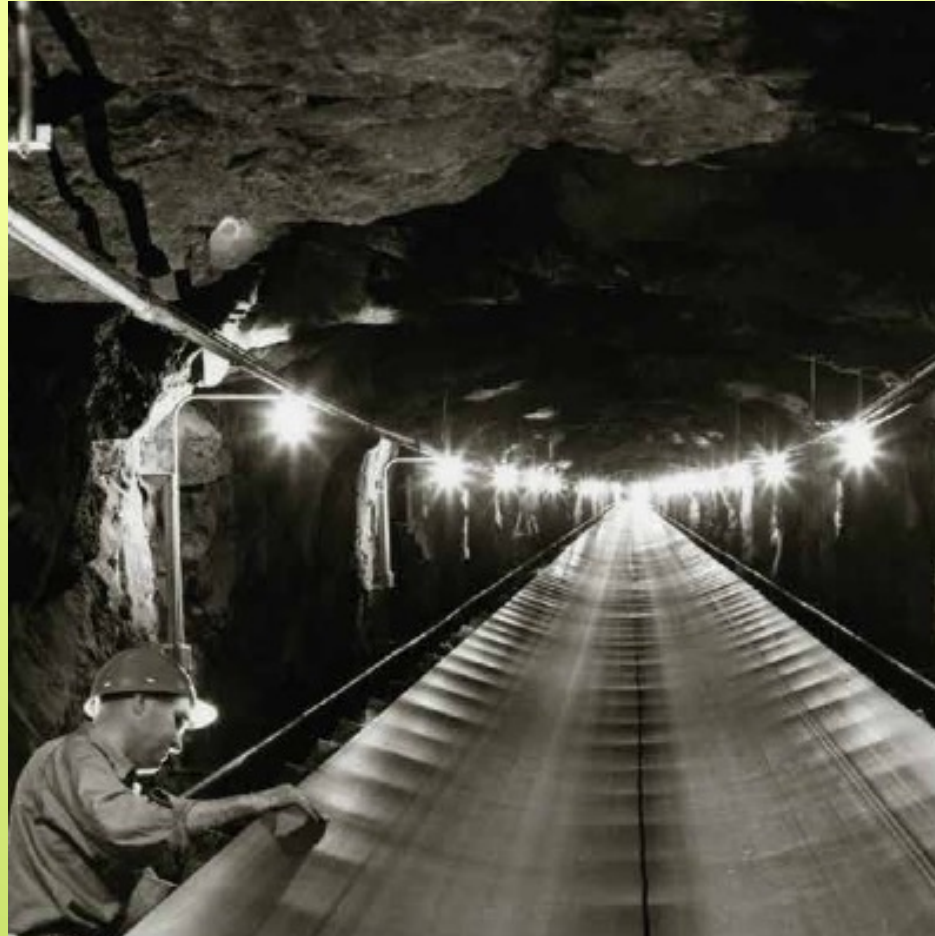


Biofuels: What We Can Learn from the Past That Might Inform the Future

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**WHY IS A HISTORIAN
STUDYING ENERGY?**



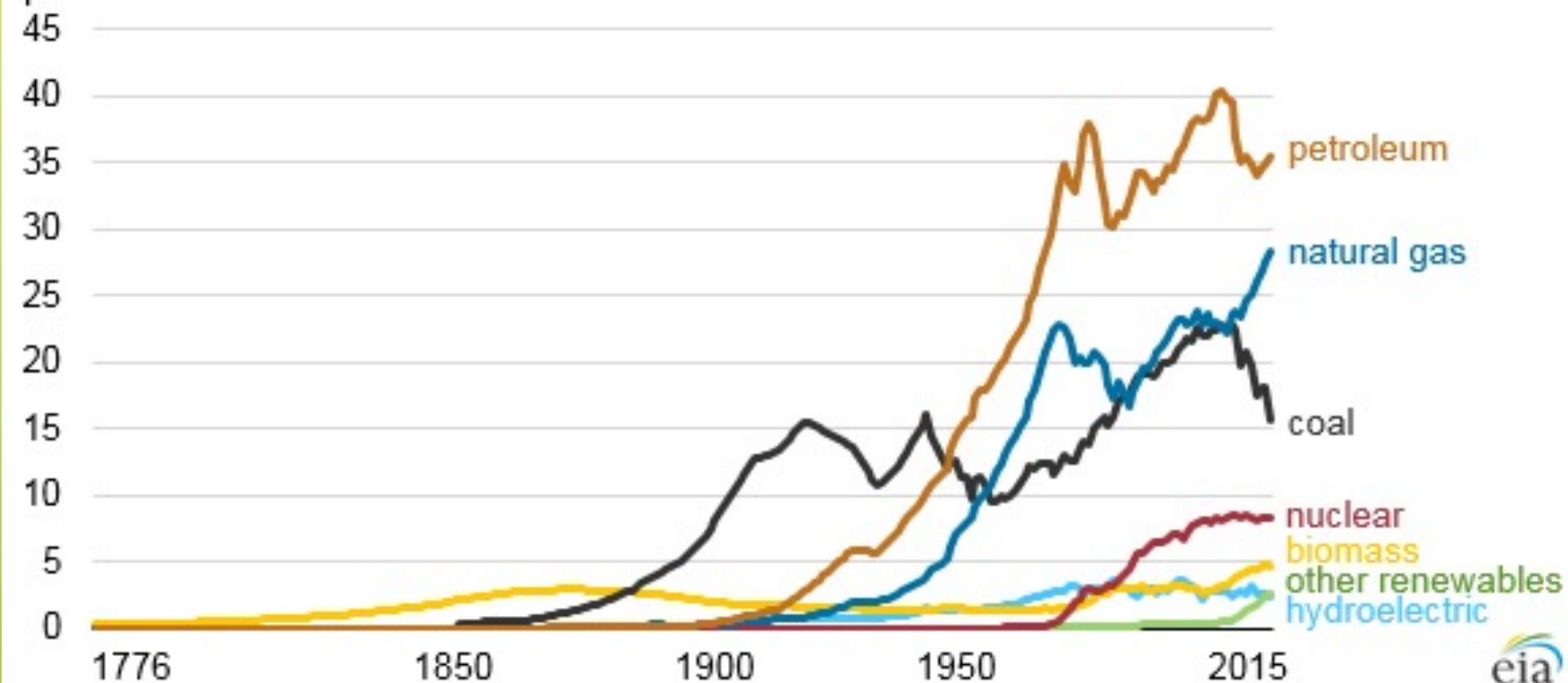
TACONITE DREAMS

The Struggle to
Sustain Mining
on Minnesota's
Iron Range,
1915-2000

Jeffrey T. Manuel

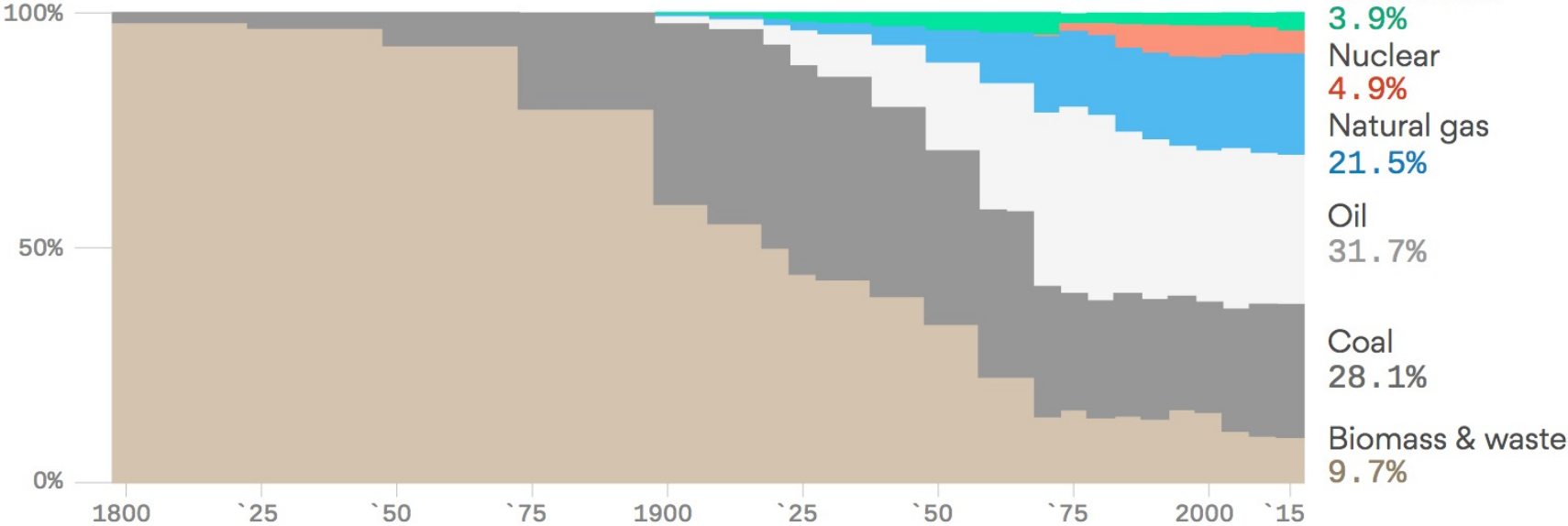
Energy consumption in the United States (1776-2015)

quadrillion Btu



Global energy sources, 1800-2015

BY SHARE



Energy Eras

Fuels	Technologies	Era (approximate)
Organic Energy Regime		
Muscle (human and animal)	Harness, plow, ax, atlatl, etc.	Modern <i>homo sapiens</i> to ~2500 BCE
Wind, Water	Sailing ship, water wheel	~2500 BCE-~1700 CE
Mineral/Fossil Fuel Energy Regime		
Coal, Wood, Biomass	Steam engine	1700s-1900
Oil	Internal Combustion Engine	1880s-present
Oil, Gas, Coal, Hydro, Nuclear, Wind, Etc.	Electricity	1890s-present

Energy Transitions

(Standard Oil Refinery, Wood River, 1907)



Parking Lot at Standard Oil's Wood River Refinery, 1914





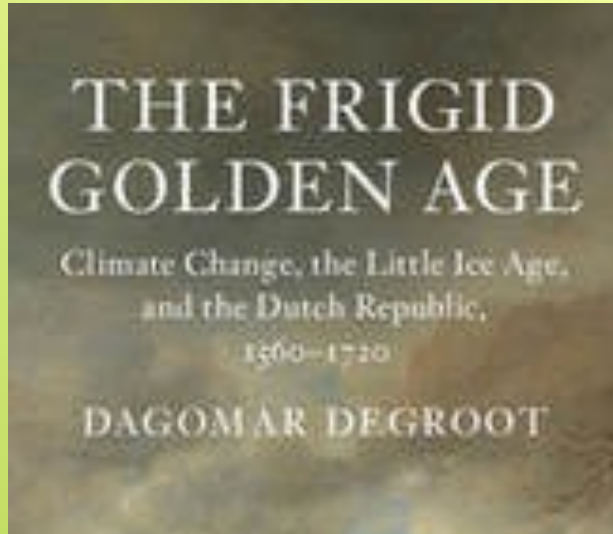
Energy Systems are Cultural and Social Choices



Rush hour in Copenhagen
(above) and St. Louis (right)



Historians Engaging Today's Political Debates



"It looks like you're about to challenge a historian, armed only with a MAGA hat and a Wikipedia page. Are you sure you want to do that?"



Eric Rauchway ✓

@rauchway

Following



The original New Deal *was* a Green New Deal—and today's Democrats need therefore to think about its failings, as well as its successes

WHERE DO BIOFUELS FIT IN?

discharge
NEVER use electronic devices during the refueling process.
NEVER allow children to use pump. Only persons of licensed age should use pump. Keep children away from pump area. Do not allow children under licensed age to use the fuel dispenser.


HEALTH WARNINGS
• Gasoline is harmful or fatal if swallowed.
• Long-term exposure to vapors has caused cancer in laboratory animals.
• Avoid prolonged breathing of vapors.
• Keep face away from nozzle and gas tank.
• Keep away from eyes and skin.
• Never siphon by mouth.
• For use as a motor fuel only.

DO NOT
Hold-Open Latch
Persons using dispensers with hold-open latches must remain at the refueling area during fueling process.
NEVER leave refueling area when using dispensers with hold-open latches.

IN CASE OF FIRE
• **DO NOT REMOVE NOZZLE FROM VEHICLE.**
• Evacuate all passengers from the vehicle and refueling area.
• Activate Emergency Shutoff Switch.
• Notify attendant.
• Call 911, if no attendant is on site.

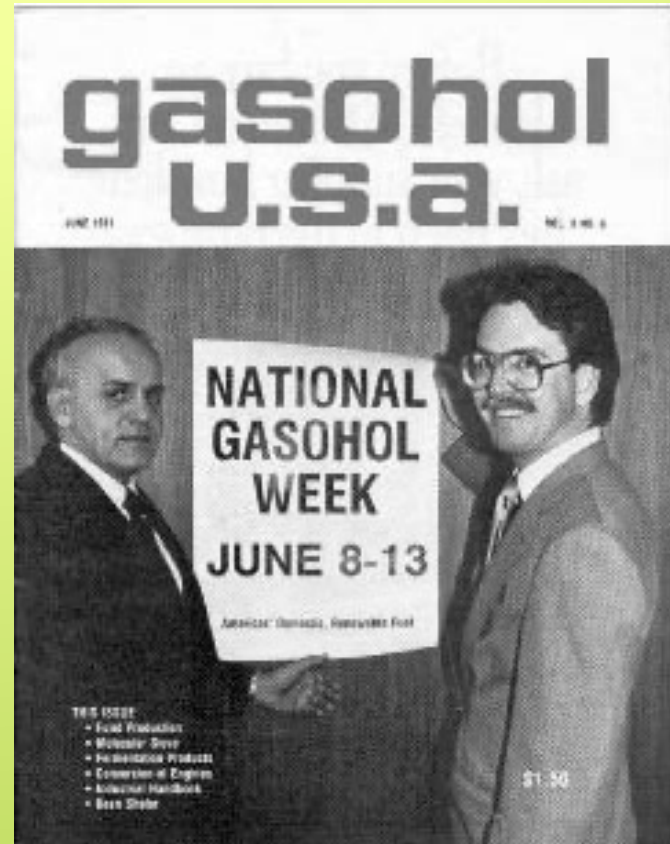
**THIS FUEL
CONTAINS
10% ETHANOL**

PERSON
EARLY
PER GAL
Open Rewards Program Terms
See the Rewards Program Terms

A vintage photograph of a gas station pump. The pump is a tall, rectangular metal structure with a fuel nozzle and hose. On top of the pump, there are several potted plants. A handwritten sign is placed in front of the pump. The sign is white with red text. The background shows a brick building with a window, a hedge, and a car parked on the street. The overall tone of the photograph is warm and slightly faded, characteristic of an old print.

CLOSED
DO TO
GASOLINE
SHORTAGE

OPEN 7 AM
CLOSED SUNDAY



10,000 GALLONS of CORN ALCOHOL Gasoline!

Blended and approved by Iowa State College chemists, will be available for distribution May 3rd, 4th, 5th and 6th at

STATION
W S Y M
We Save You Money

1 gallon of Corn Alcohol added to 9 gallons of Vickers Vic-Oil-ized Regular Gasoline makes 10 gallons of A-1 Plus Motor Fuel—A MOTOR FUEL THAT WILL PLEASE THE MOST CRITICAL MOTORIST!

SQUARE DEAL OIL COMPANY

One Block North of Highway Commission

A. J. Lewis, Mgr.

YOU

*can Raise
your own*
MOTOR FUEL



Right on **YOUR FARM!**

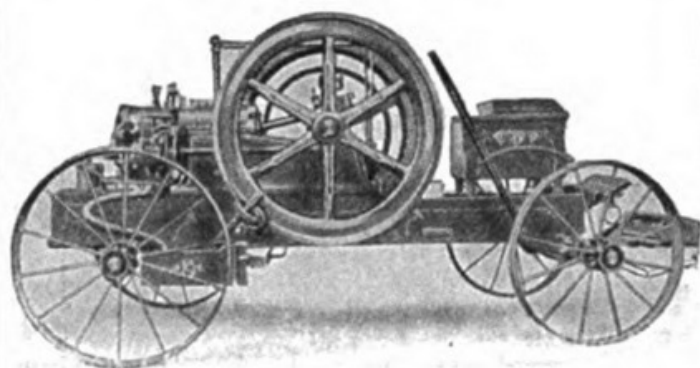
**Gasolene is high, but
THE COMING
FUEL IS
ALCOHOL**



Wright's BOOK
gives full directions
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and De-Naturing.

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120 P. M. Liberty Street **NEW YORK**



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Landis Brothers, Rheems, Pa.

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Two Key Questions

1. Why did alcohol fuel fail to live up to its promise as a true alternative to oil and gas in the modern United States?
1. Conversely, why did alcohol fuel remain so attractive to many Americans, despite so many failed promises, throughout the twentieth century?

Six Eras of Alcohol Fuels in United States

1. Camphene Era (1830s-1860s)
2. Era of Early Autos (1880s-1910)
3. Era of Farm Relief (1920s-1930s)
4. “Hamburger Helper for the Gasoline Supply” (1970s)
5. Era of Environmentalism (mid-1980s-2001)
6. Era of Energy Security (2001-present)

**CURRENT RESEARCH
(AKA, JEFF TAKES A TRIP TO
“THE IOWA OF BRAZIL”)**

ACLS Collaborative Research Fellowships 2018

Agriculture's Energy: Learning from the History of Biofuels in Brazil and the United States

- What can we learn about a potential renewable energy future from the past century of industrial biofuels in the western hemisphere?
- How do national cultures, economies, and policies shape energy systems?
- Should renewable energy be promoted within the fossil fuel sector, or by outside firms?
- What are the likely benefits *and costs* of the emerging renewable energy system?

The Perennial Alternative: A Century of Biofuels in Brazil and the United States and Its Lessons for the Future

- Ethanol has a long history. It was a bridge into the oil era and may be a bridge out of it.
- Ethanol's history is global. US debates are important, but not the whole story.

Some Tentative Lessons

- There are winners and losers in every energy system. The coming renewable energy system will be no different.
- Old questions about limits and tradeoffs in an organic energy regime might return in the future.
- In a diversified, post-fossil fuel energy system, national and regional resource endowments are likely to matter *more*.