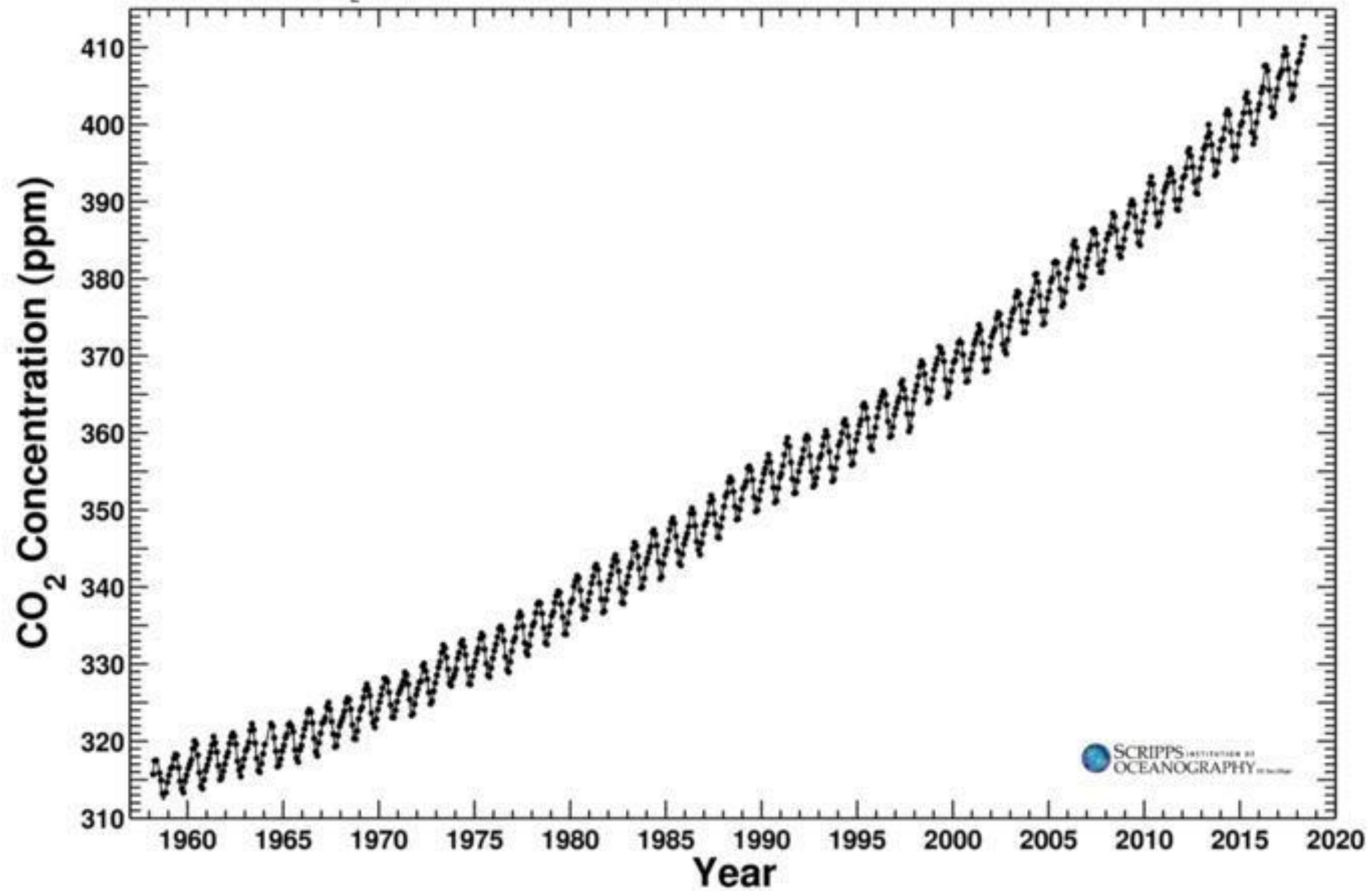


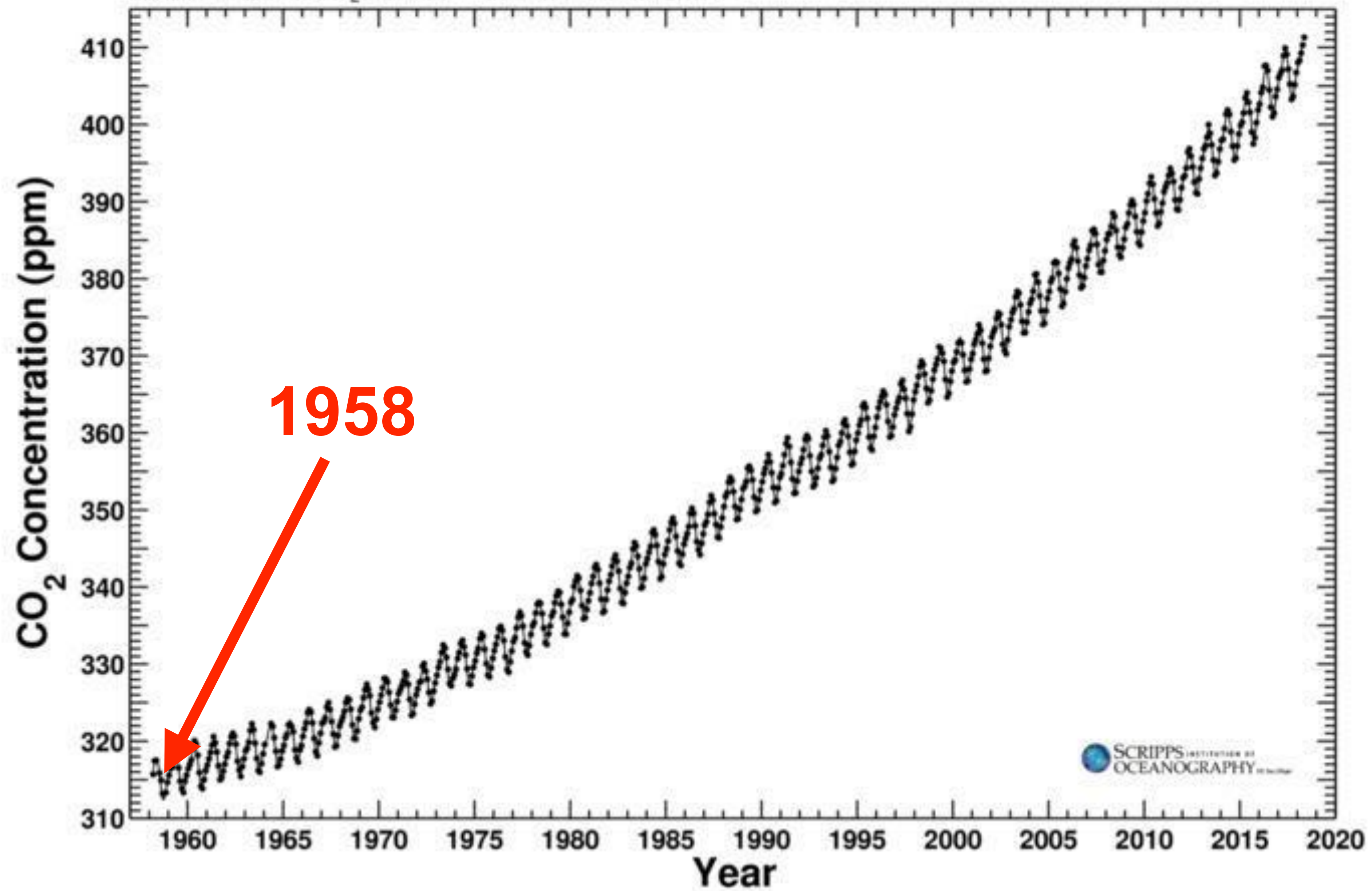
**Covid-19,
Climate Change, *and*
the Coming Energy Crisis**

**Ron Swenson
Citizens Climate Lobby
16 May 2020**

The Keeling Curve is what keeps us all awake at night



The Keeling Curve is what keeps us all awake at night



King Hubbert had introduced *another* curve in 1948



**M King
Hubbert**

1903-1989

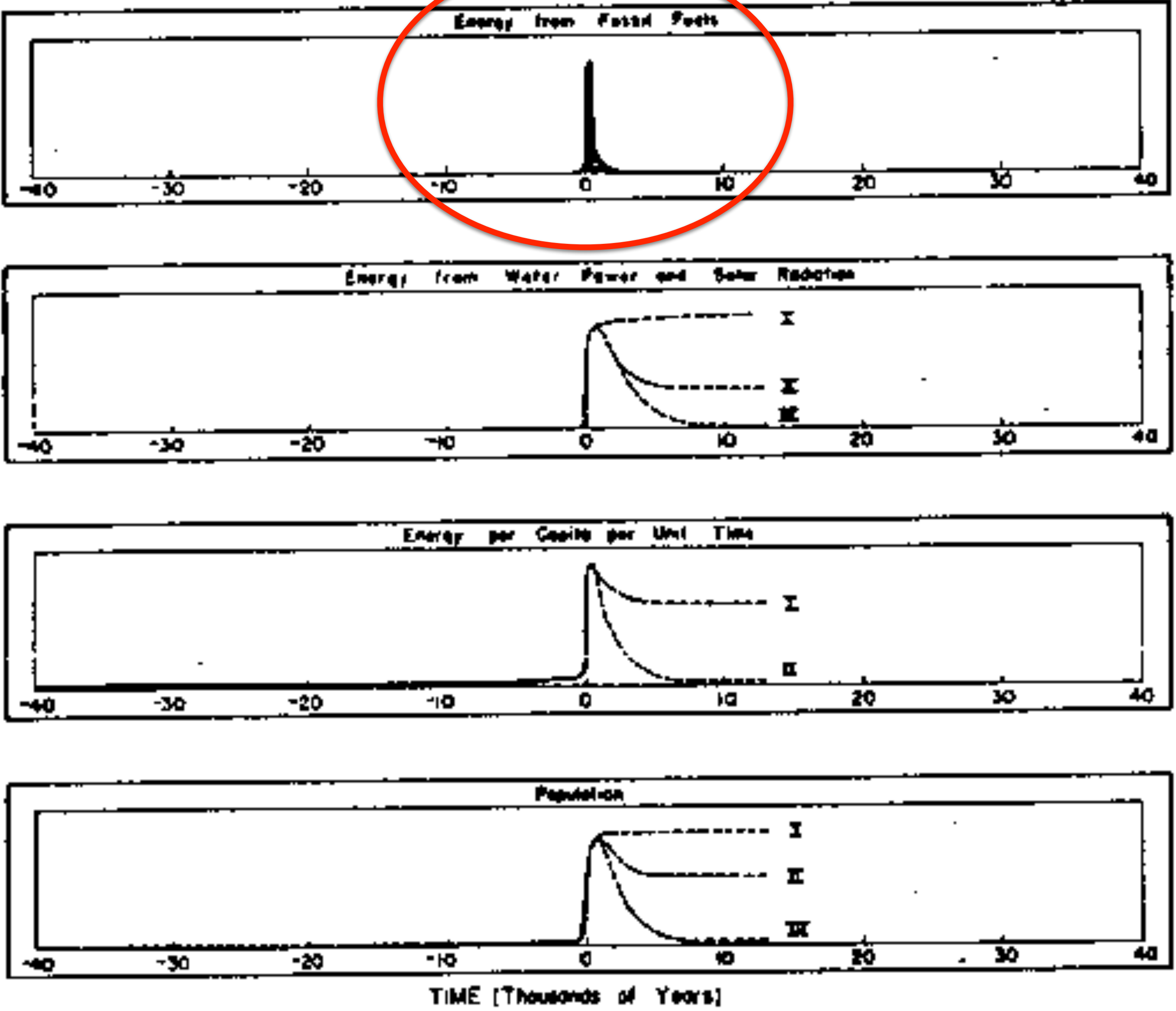
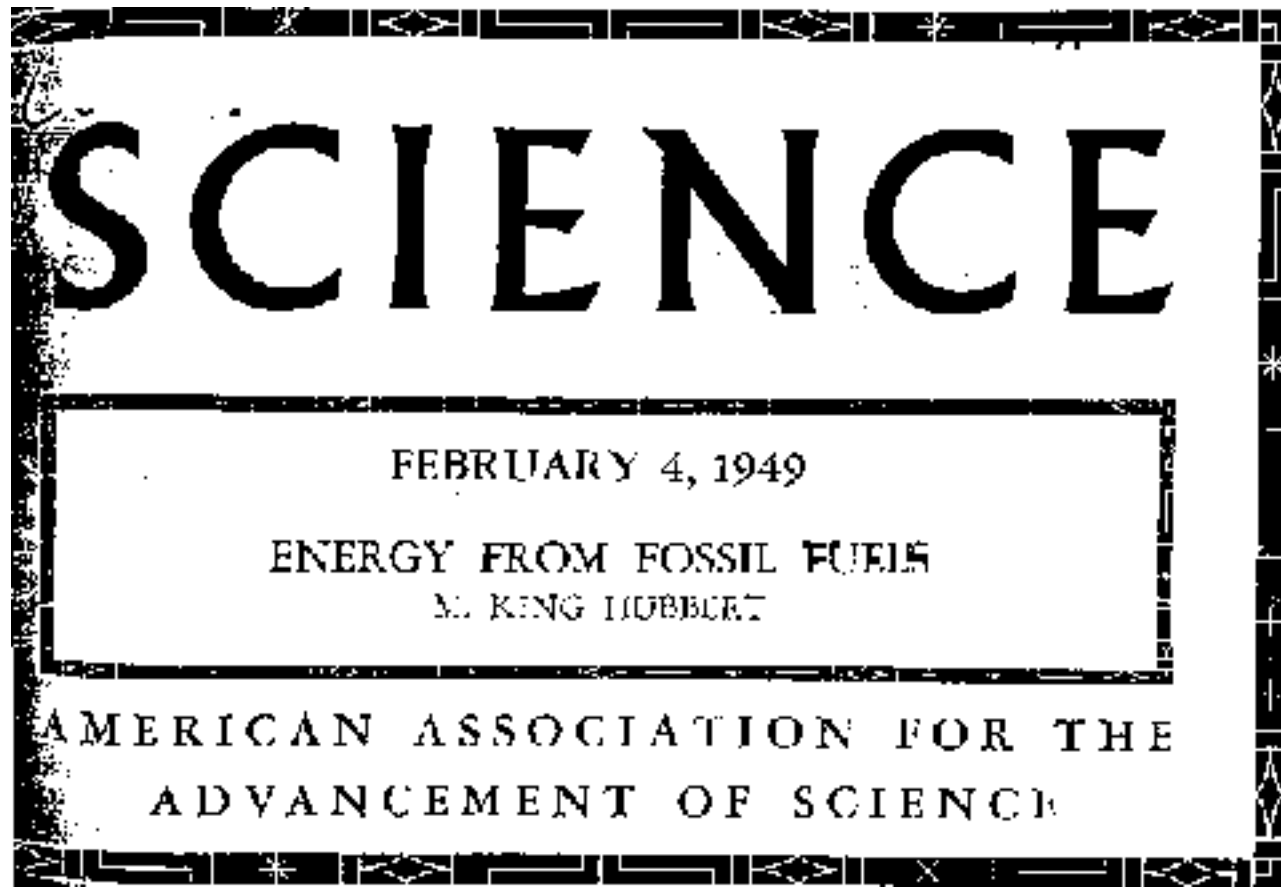


FIG. 8. Human affairs in time perspective.

It was 1966 when I realized that oil is finite



- ***We must save our oil for a rainy day***
- ***We can meet the needs of all humanity by doing more with less***

We've had many wake-up calls

We've had many wake-up calls



1973



We've had many wake-up calls



1973



and around the world ... many times since

We've had many wake-up calls



and the
world ... many
times since

We've had many wake-up calls



and the
many
since

We've had many wake-up calls



Fuel shortage in Egypt leads to rising tensions; citizens fear possible price hikes, more unrest

Tuesday, 17 January 2012



The streets of Cairo and other cities have been blocked by queues of cars, often snaking around the block, since shortages started becoming apparent on Saturday. (File photo)



since

We've had many wake-up calls



Fuel shortage in Egypt leads to rising tensions; citizens fear possible price hikes, more unrest

Tuesday, 17 January 2012



The streets of Cairo and other cities have been blocked by queues of cars, often snaking around the block, since shortages started becoming apparent on Saturday. (File photo)



“Those who don’t study history are doomed to repeat it. Yet those who *do* study history are doomed to stand by helplessly while everyone else repeats it.”

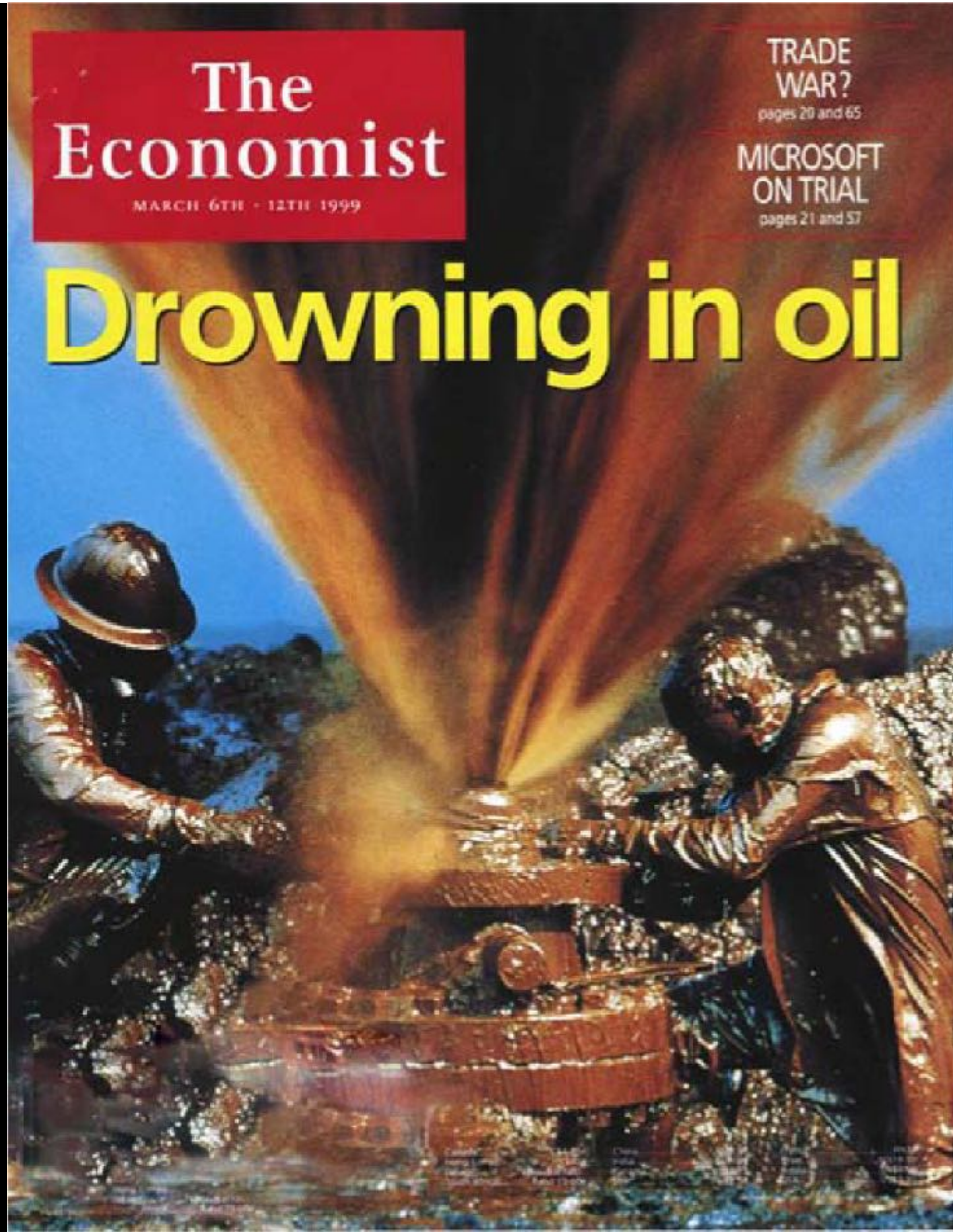


**Lack of political will
and deception prevail**



CARLSON
UNIVERSAL UTAH
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There's a lot of hype about oil's bright future



Confusion about supply and demand is propagated



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BP chief sees risk of oil demand passing peak as pandemic hits

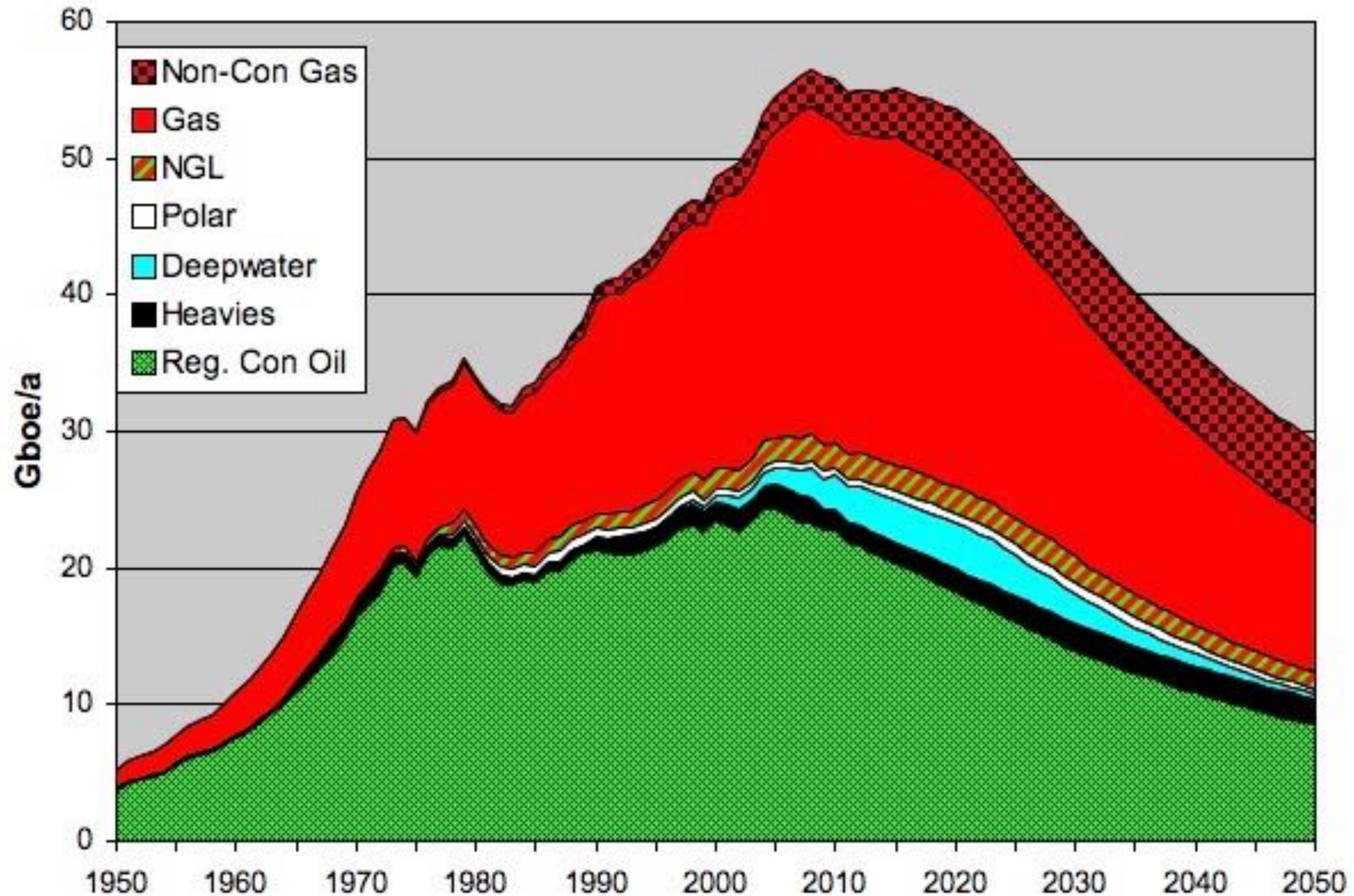
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Those stories mask the inevitability of oil decline



The stories stretch even further when net zero

Bloomberg Green

Energy & Science

Big Oil Has Big Plans for Net Zero. Are They Credible?

By Akshat Rathi

May 12, 2020, 3:00 AM PDT



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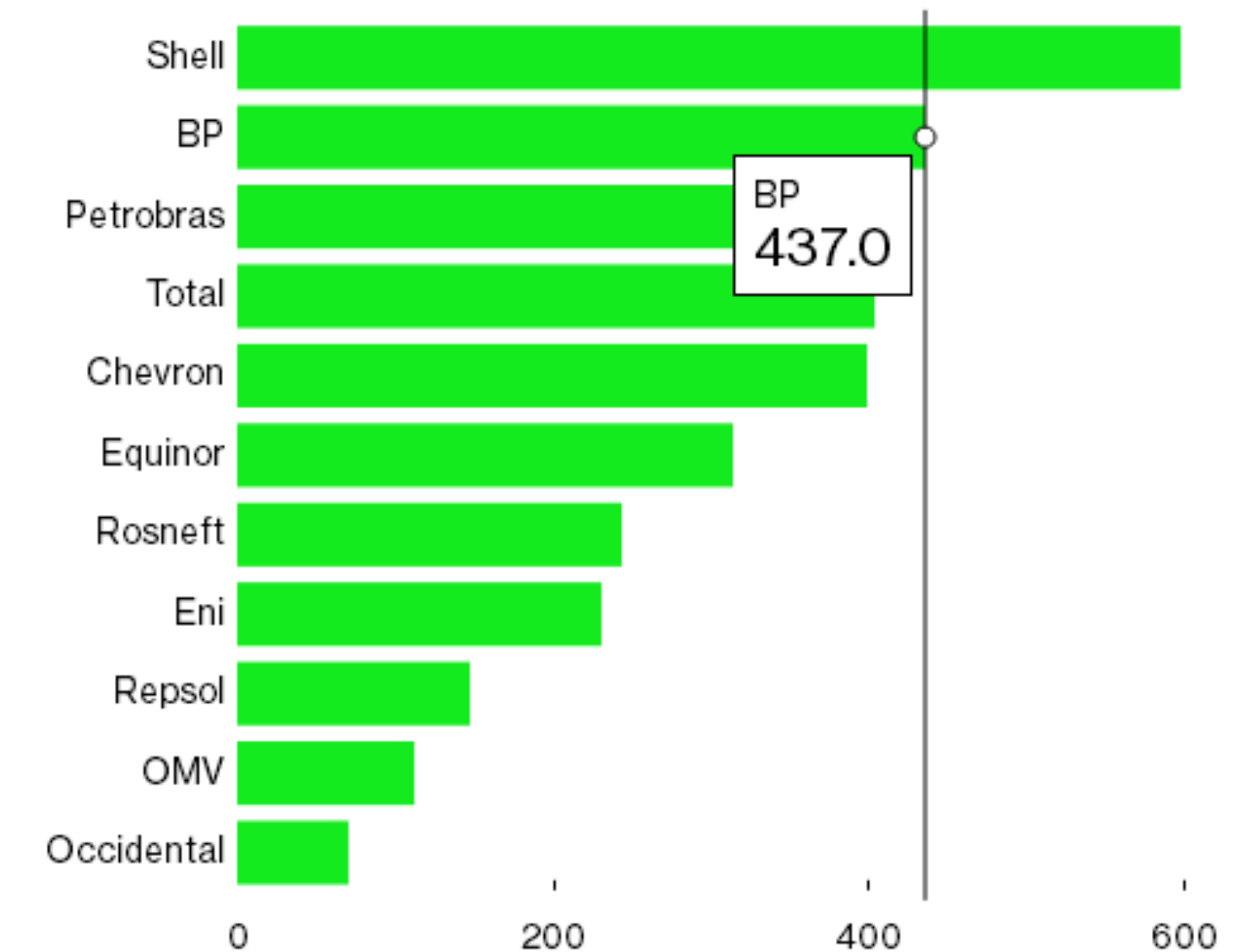
Druckenmiller Says Risk-Reward in Stocks Is Worst He's Seen

Bloomberg Green

Carbon Impact

Scope 3 emissions make up 90% of most oil companies' total emissions

■ Million metric tons of carbon dioxide equivalent



Source: Bloomberg

The hard part is the rest, namely Scope 3 emissions. All the oil companies have different targets:



The Saudis and Russians clashed on Fukushima day

WSJ

THE WALL STREET JOURNAL.

Saudis Plan to Increase Oil Production Capacity in **Price War** With Russia

MARCH 11, 2020 | BENOIT FAUCON, SUMMER SAID, DAVID HODARI

CNN

And then look what happened?!



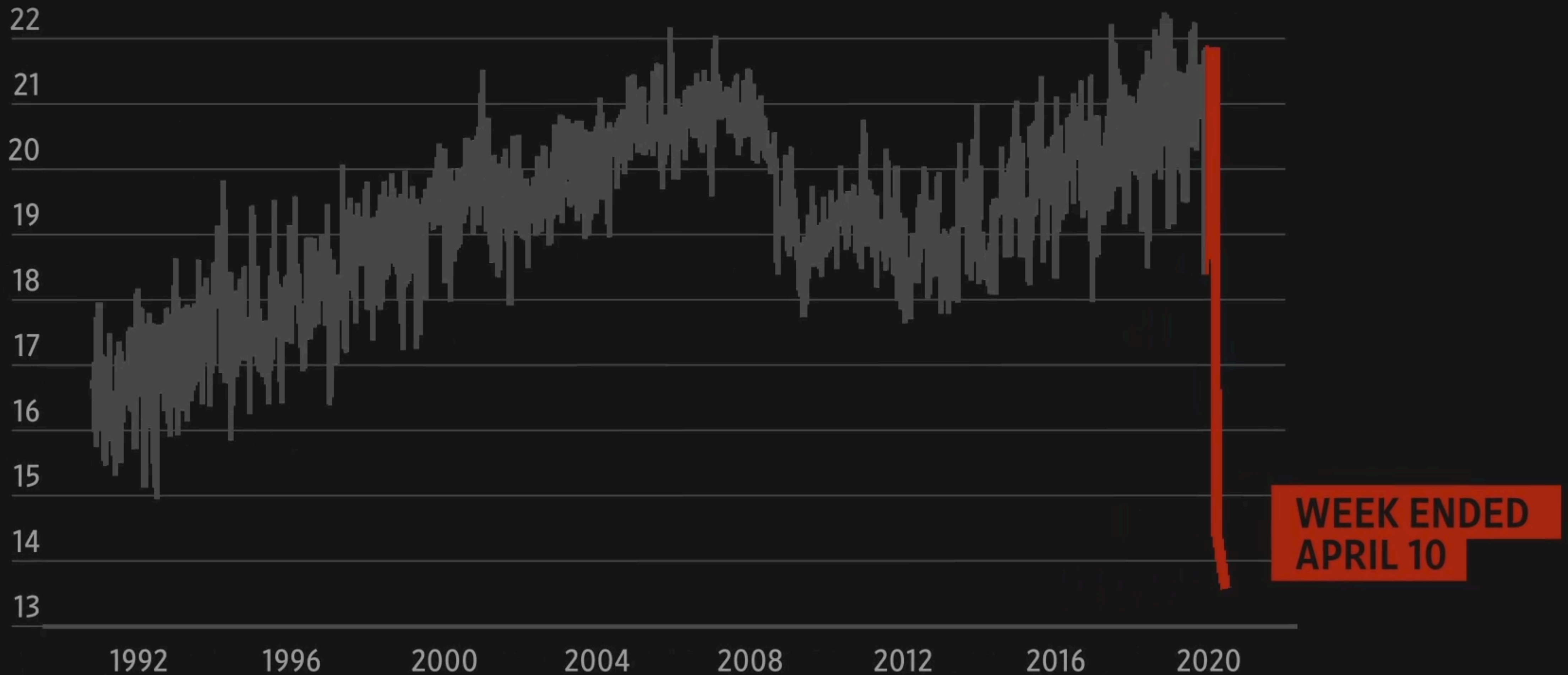
The crash in oil demand is the visible part of the story

The Forces Fueling 2020's Oil Bust

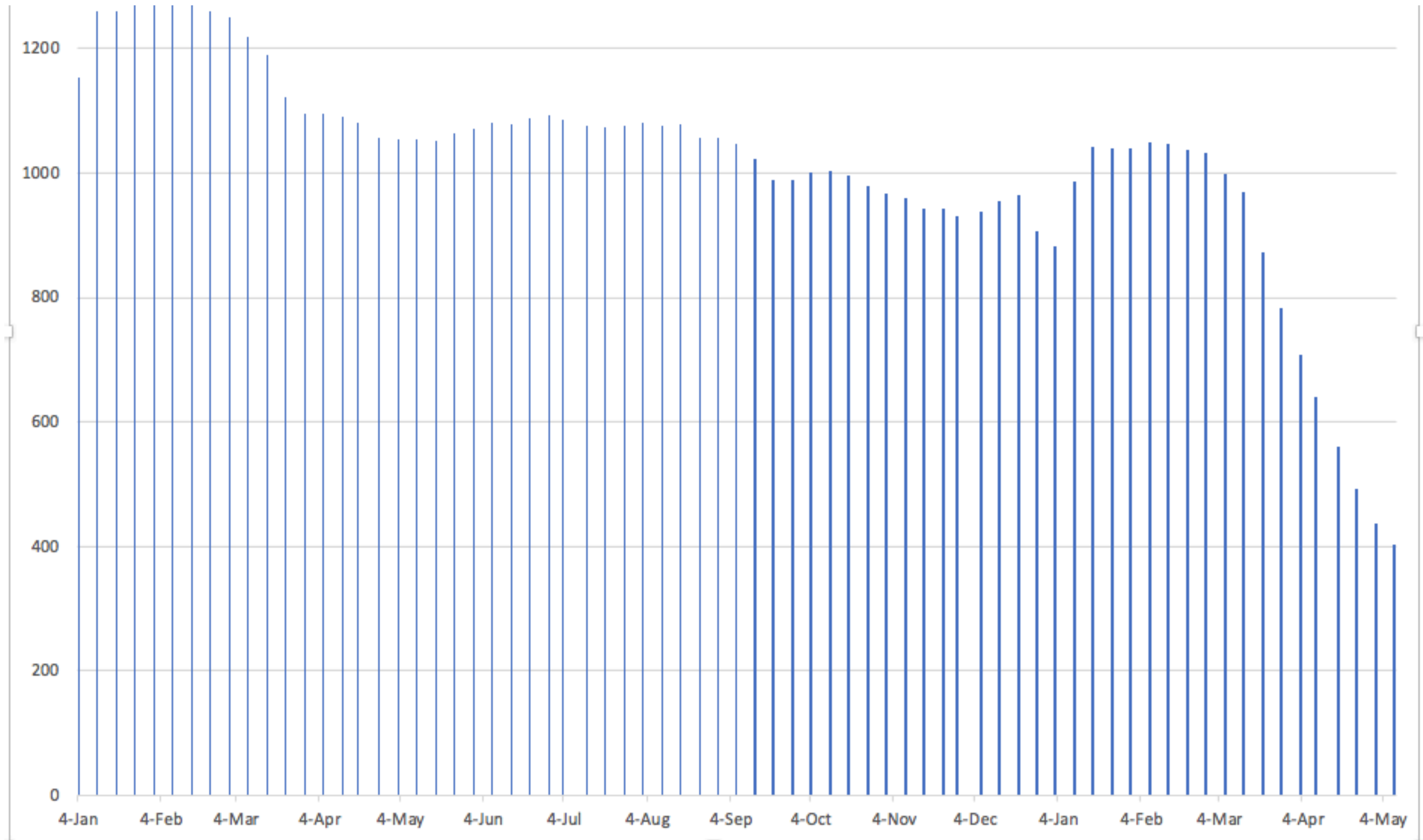
U.S. PETROLEUM DEMAND, WEEKLY

WSJ

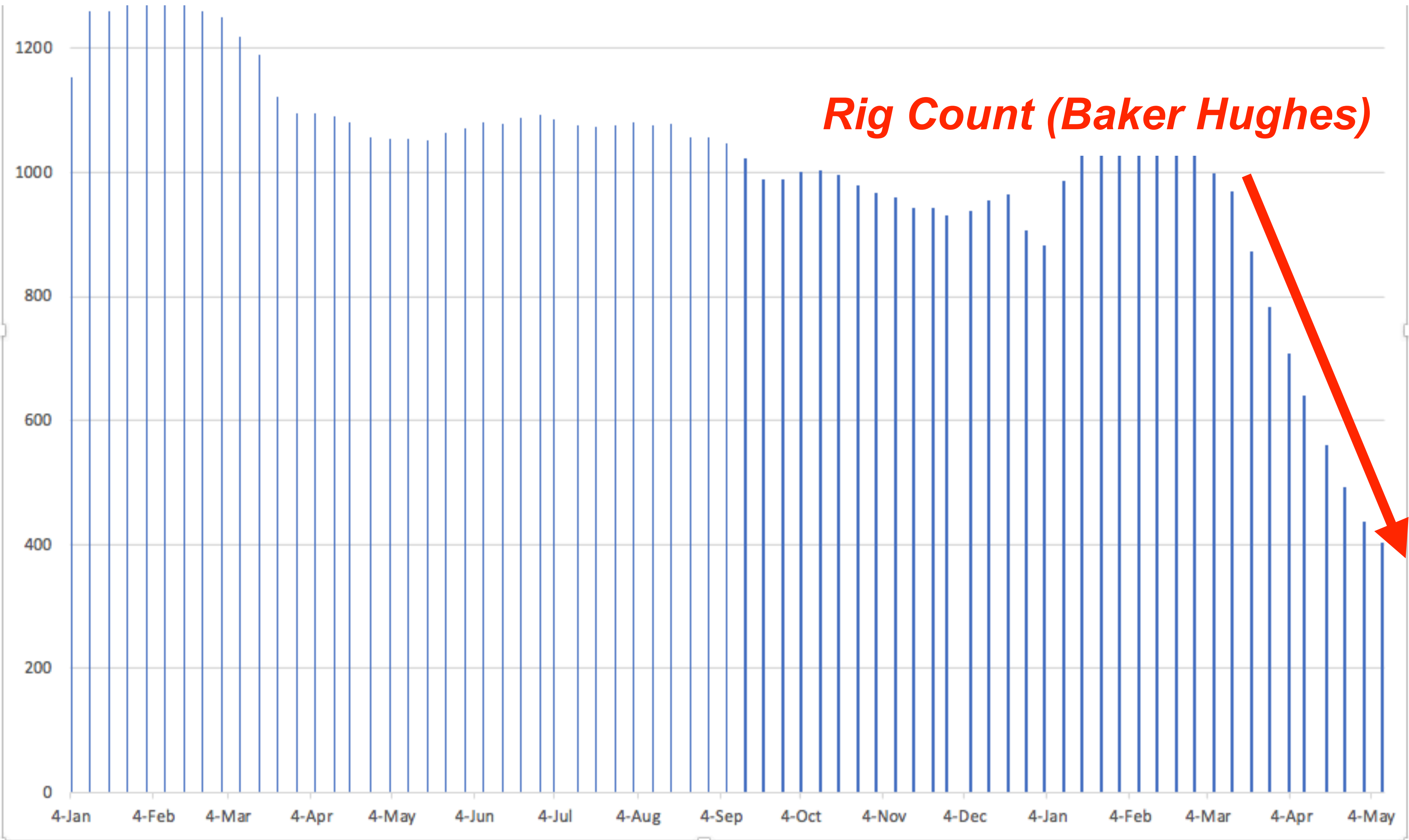
23 MILLION BARRELS A DAY



The back side of the story reveals another crisis in the making



The back side of the story reveals another crisis in the making



What are we up against?

Boy, have I got news for you!

3. Climate change

After three years in office, the Trump administration has dismantled most of the significant climate and environmental policies the president promised to undo. Calling the rules unnecessary and burdensome to the fossil fuel industry and other businesses, his administration has weakened Obama-era limits on planet-warming carbon dioxide emissions from power plants and cars and trucks and rolled back many more rules governing clean air, water, and toxic chemicals. Several major reversals have been finalized in recent weeks as the country has struggled to contain the spread of the new coronavirus.

In all, a New York Times analysis, based on research from Harvard and Columbia Law Schools and other sources, counts more than 60 environmental rules and regulations officially reversed, revoked or otherwise rolled back under Mr. Trump. An additional 34 rollbacks are still in progress.

Boy, have I got news for you!

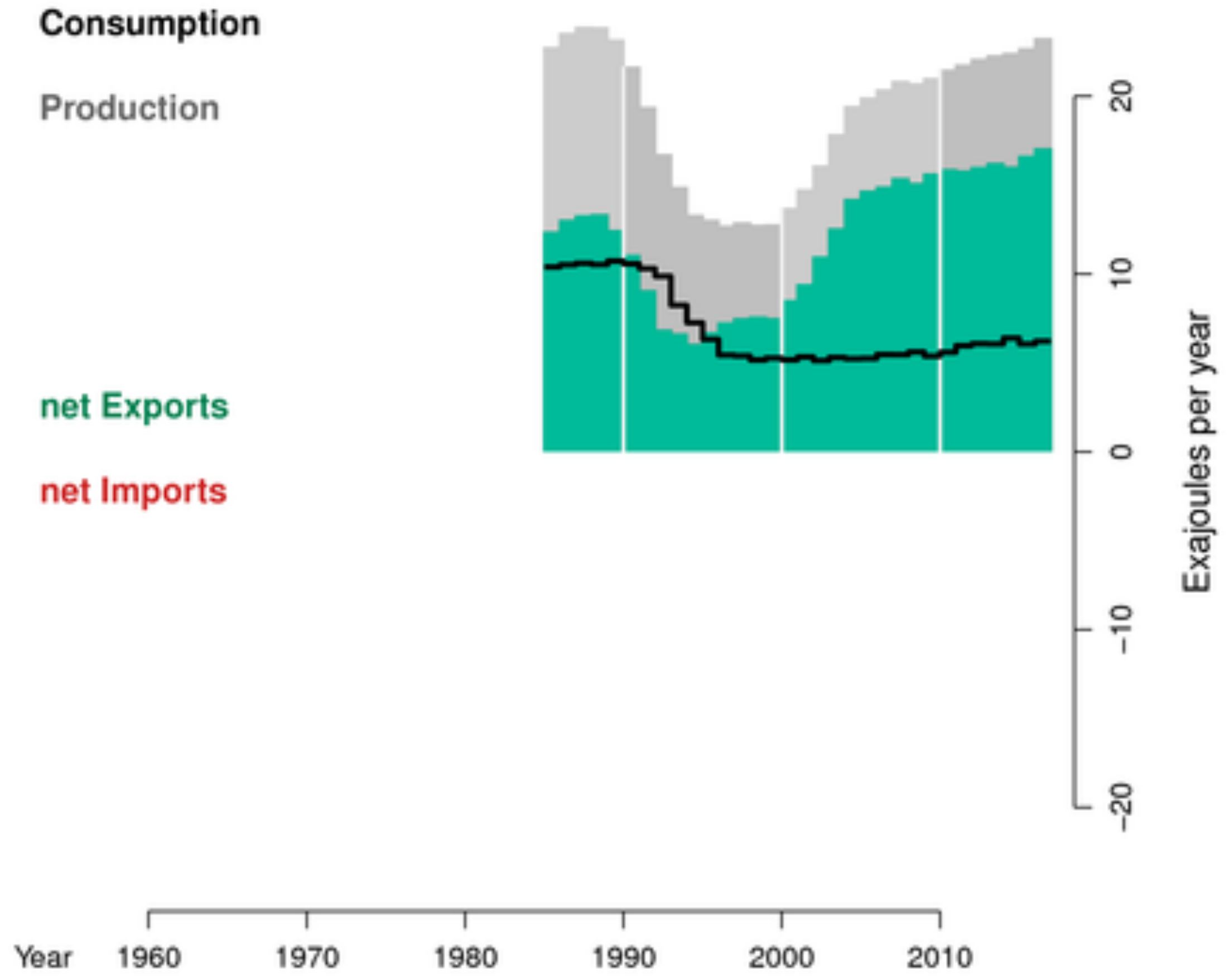
	Completed	In progress	Total
Air pollution and emissions	19	8	27
Drilling and extraction	11	8	19
Infrastructure and planning	10	1	11
Animals	9	2	11
Toxic substances and safety	6	2	8
Water pollution	4	7	11
Other	5	6	11
All	64	34	98

**What are we *really*
up against?**

It all comes down to cases—some cats got it

Russia : Oil

2016 exports increased by 2.4 %

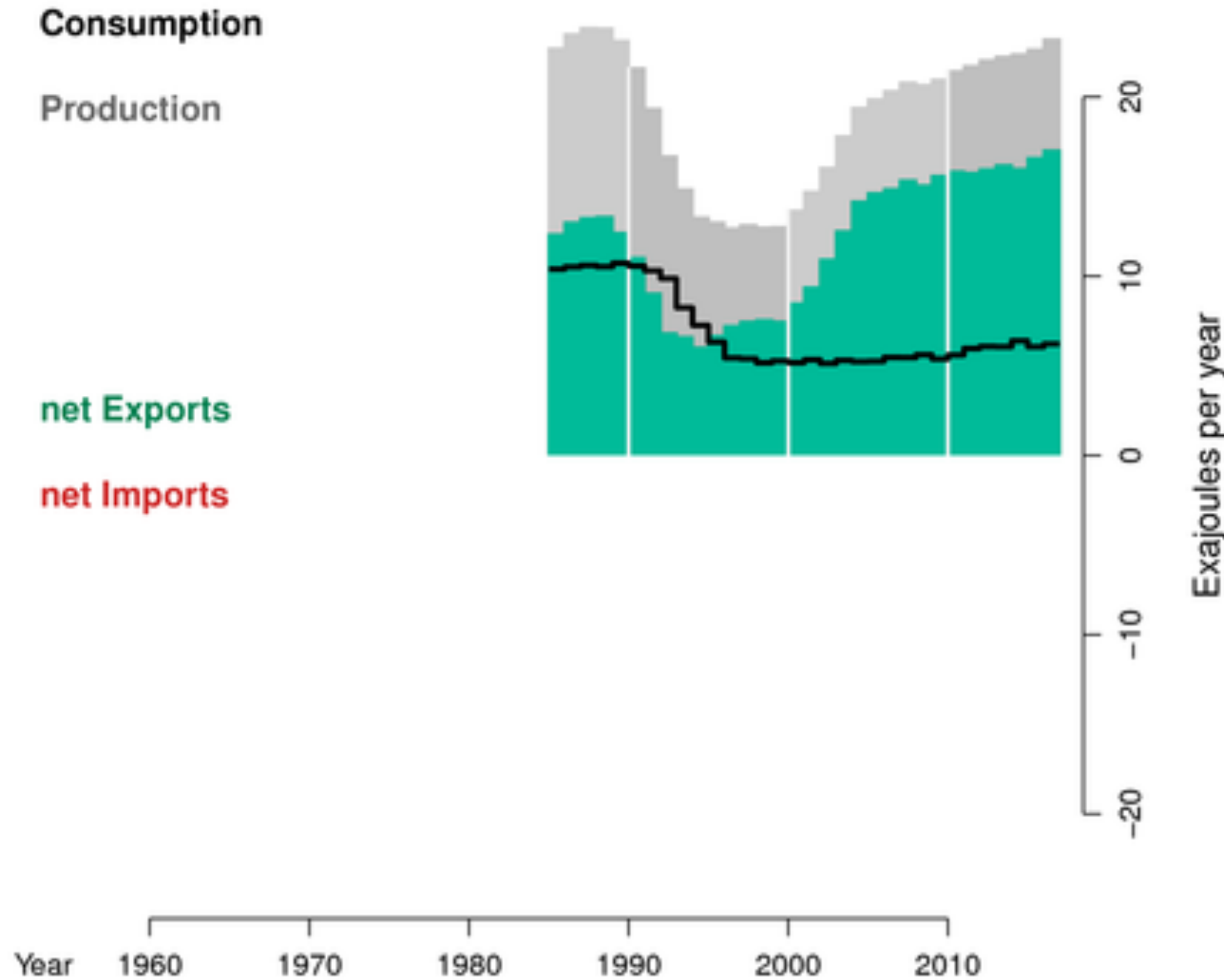


Data: BP Statistical Review 2016 Graphic: mazamascience.com

It all comes down to cases—some cats got it, some cats ain't

Russia : Oil

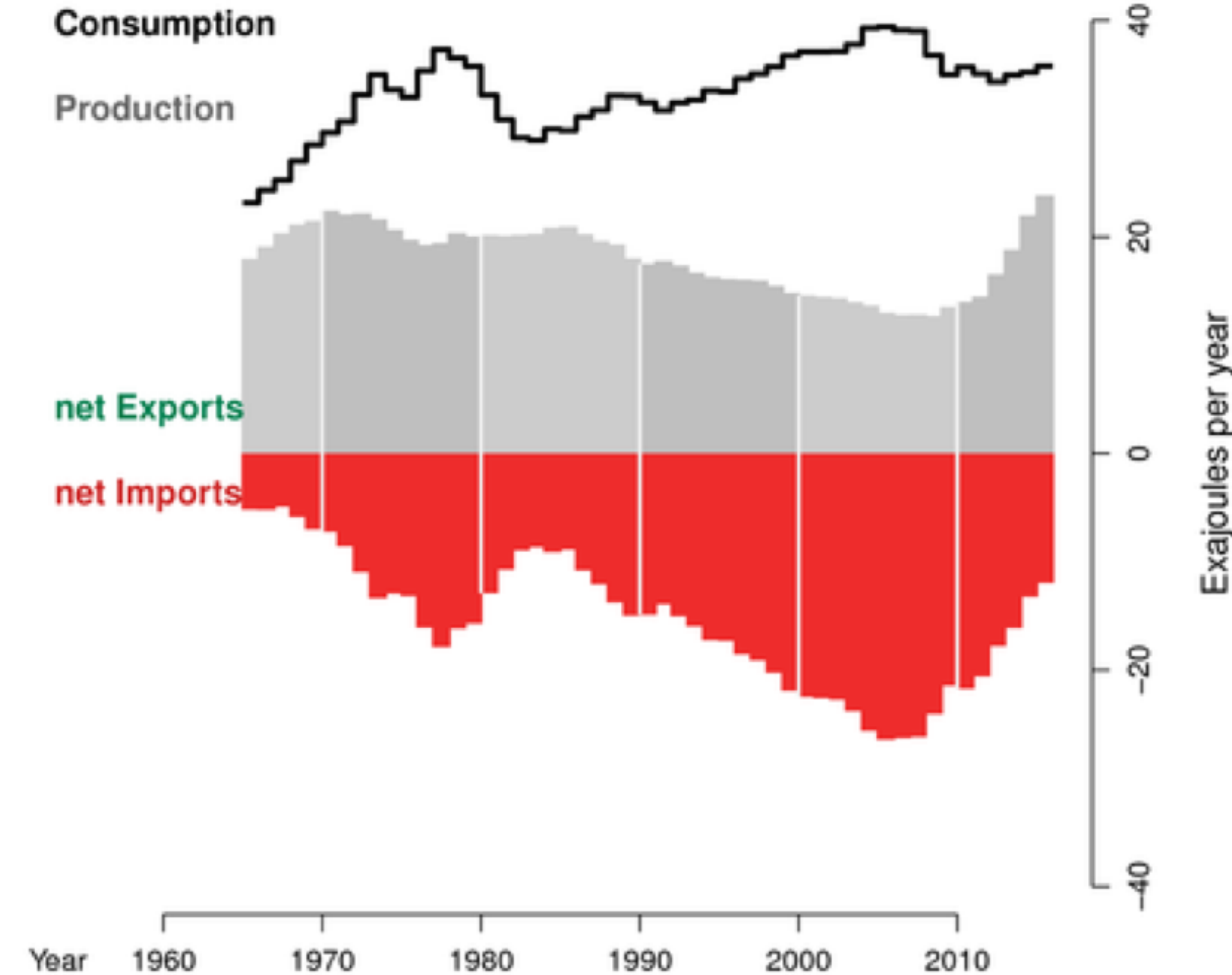
2016 exports increased by 2.4 %



Data: BP Statistical Review 2016 Graphic: mazamascience.com

United States : Oil

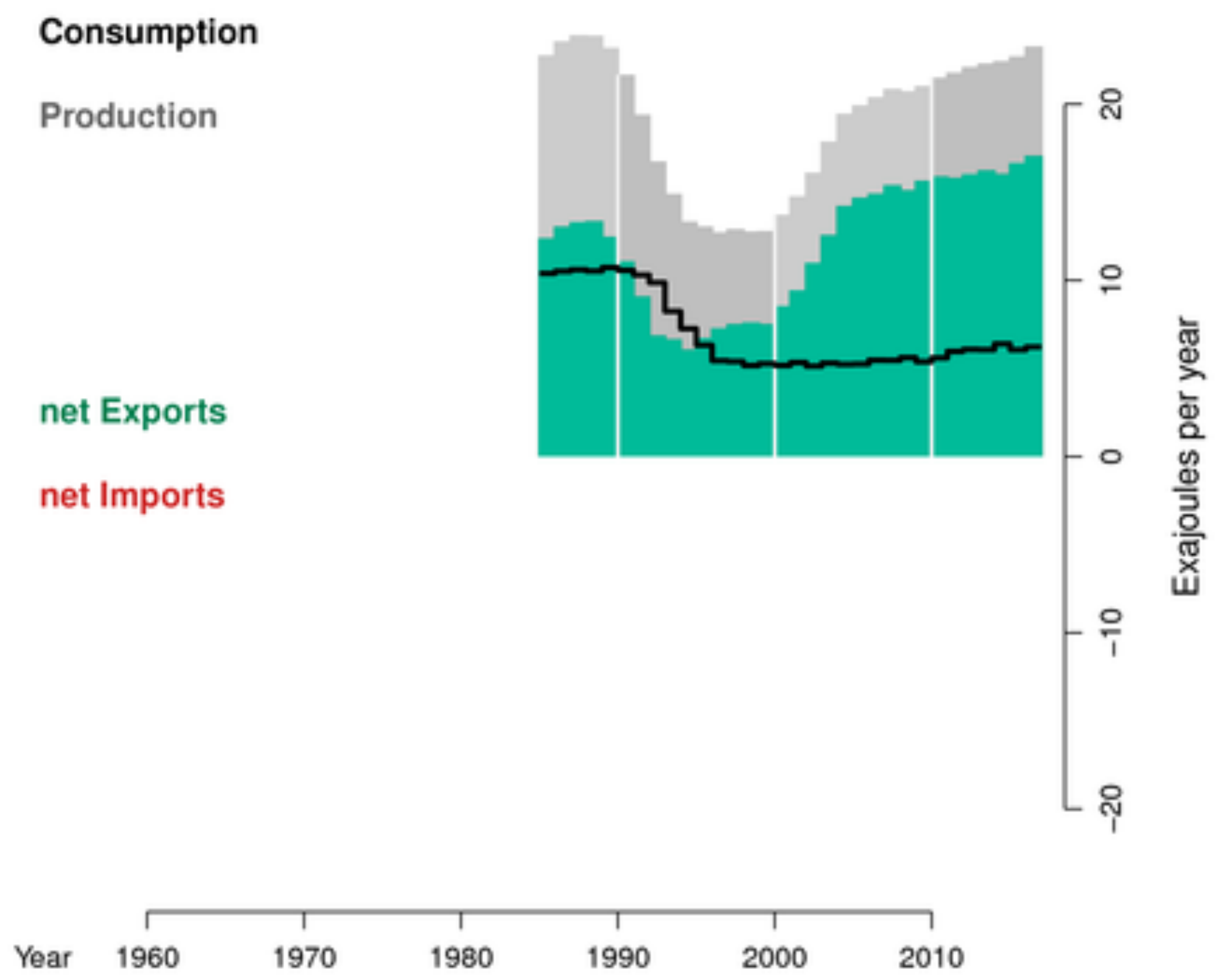
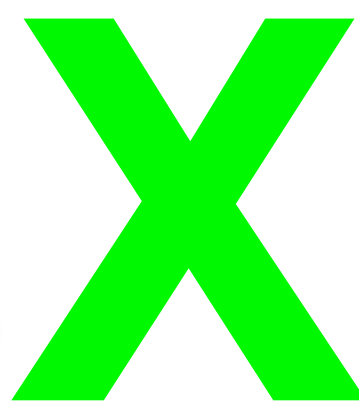
2015 imports decreased by 9.7 %



Data: BP Statistical Review 2016 Graphic: mazamascience.com

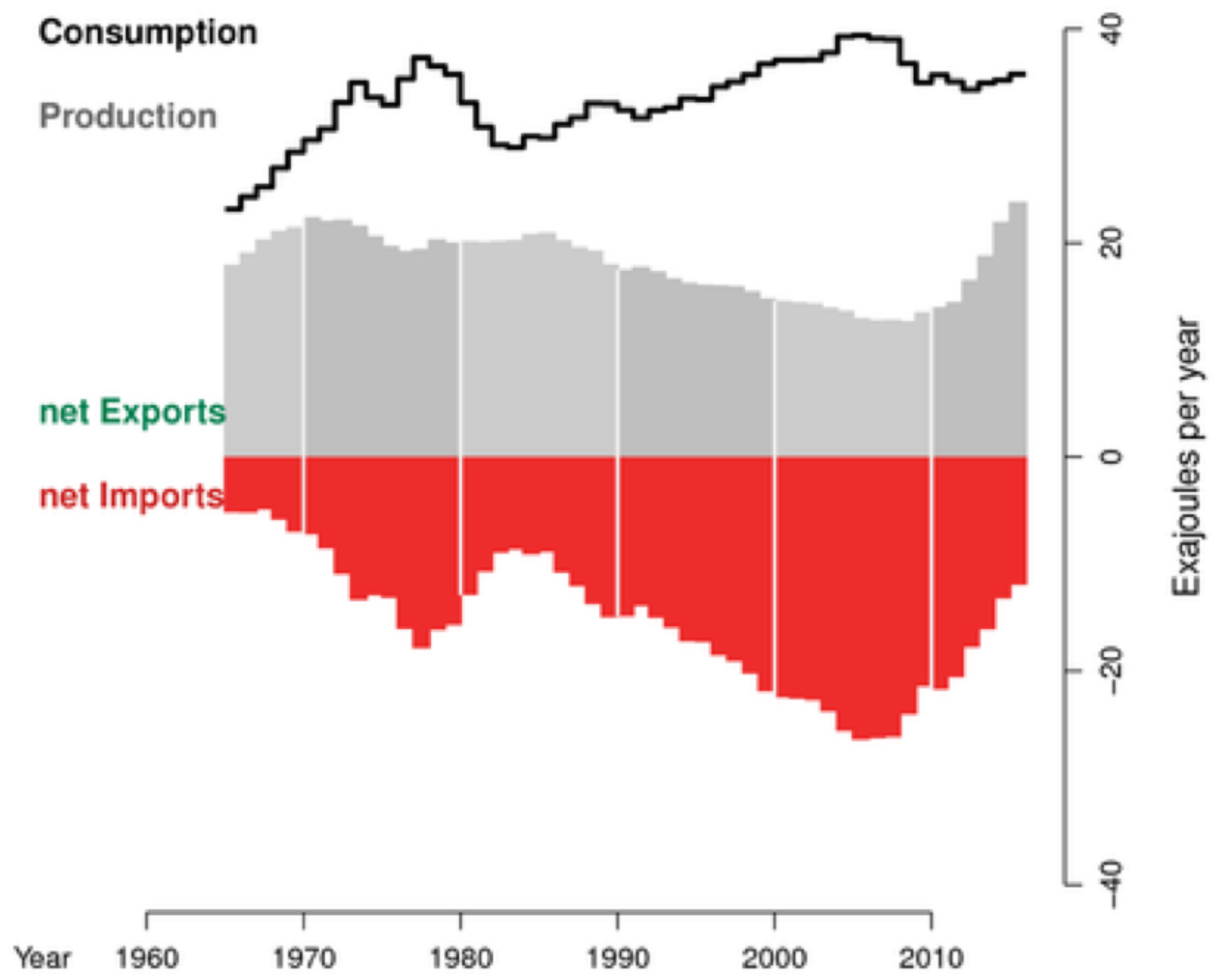
It all comes down to cases—some cats got it, some cats ain't

Russia : Oil
2016 exports increased by 2.4 %



Data: BP Statistical Review 2016 Graphic: mazamascience.com

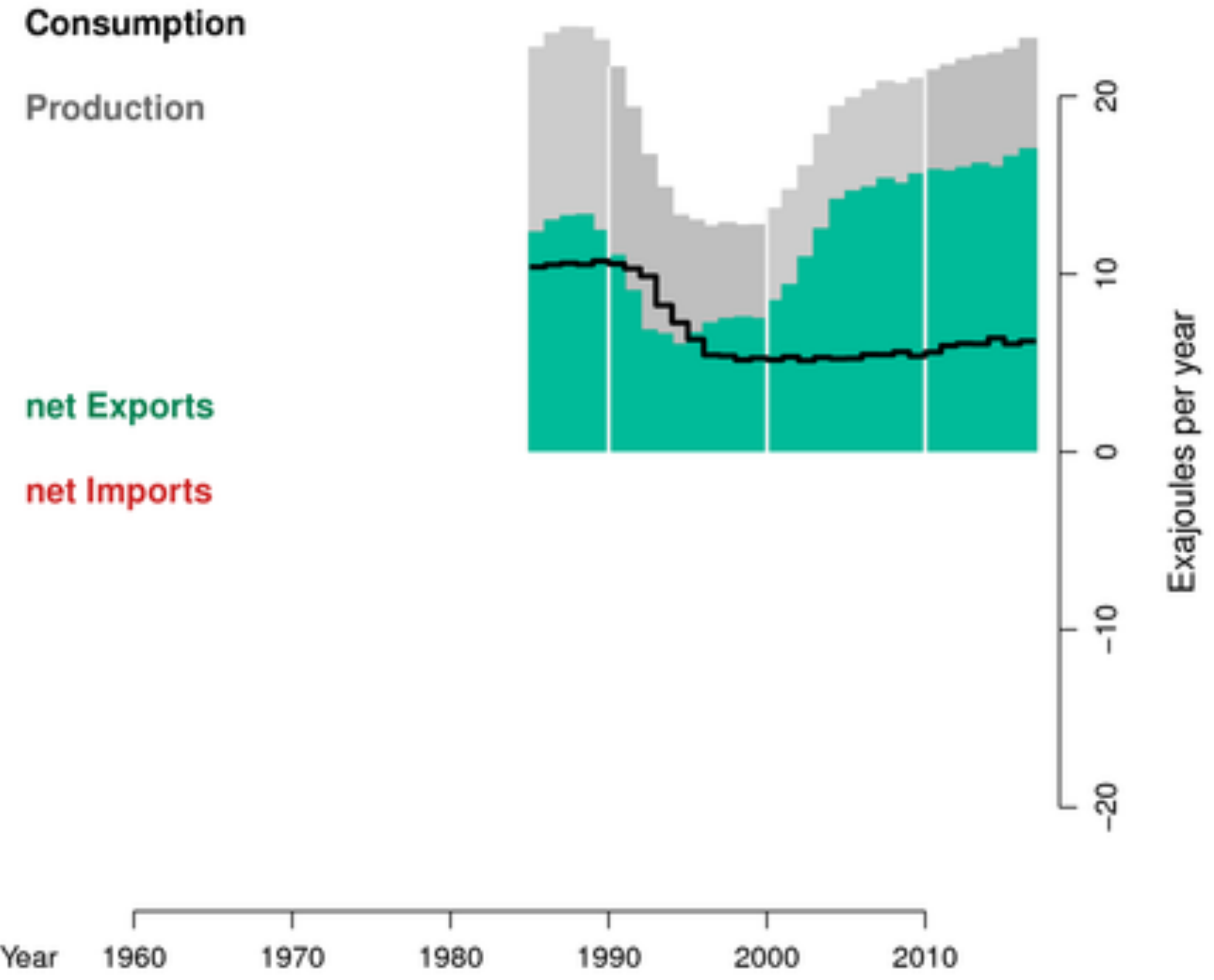
United States : Oil
2015 imports decreased by 9.7 %



Data: BP Statistical Review 2016 Graphic: mazamascience.com

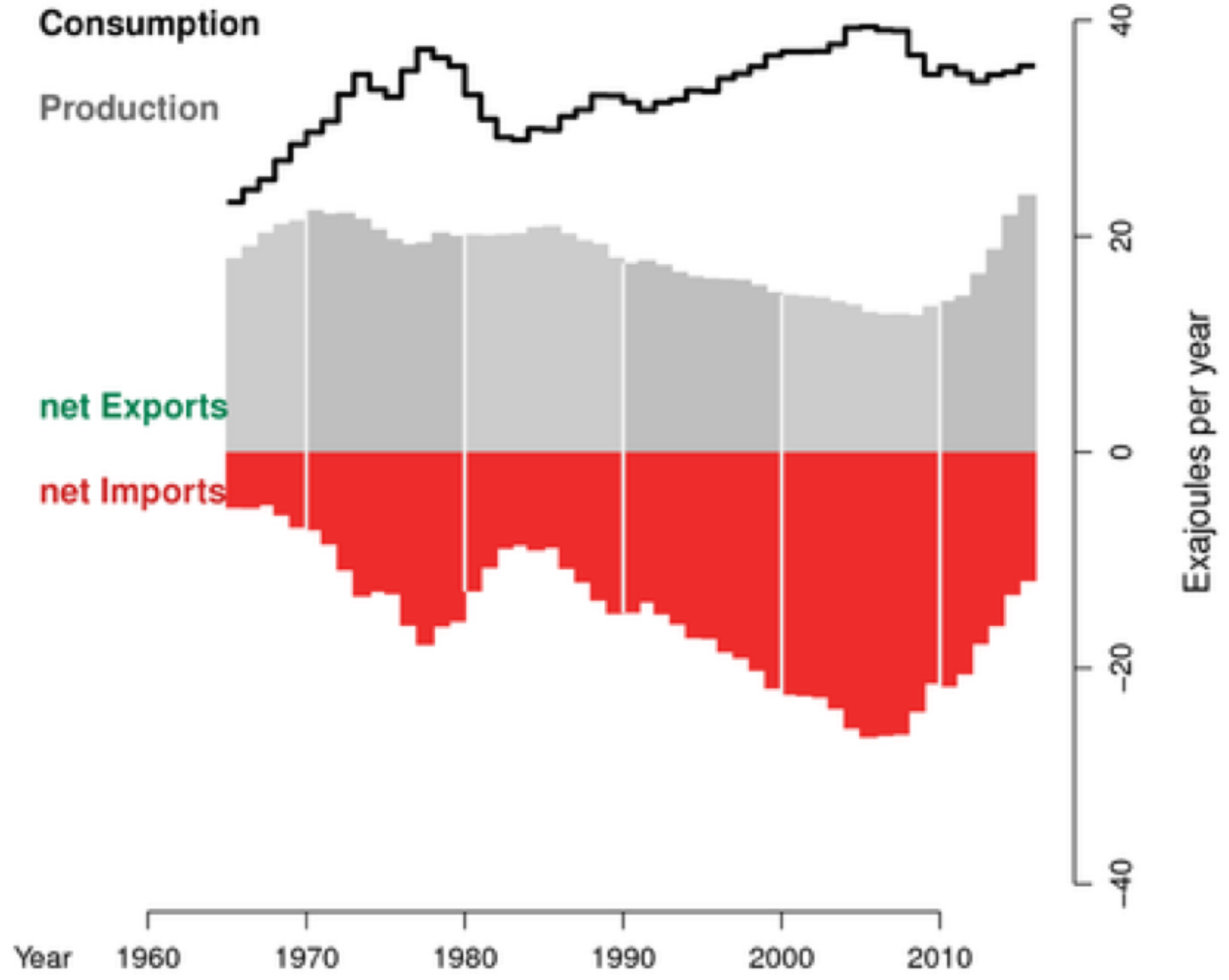
It all comes down to cases—some cats got it, some cats ain't

Russia : Oil **X**
2016 exports increased by 2.4 %



Data: BP Statistical Review 2016 Graphic: mazamascience.com

United States : Oil **M**
2015 imports decreased by 9.7 %

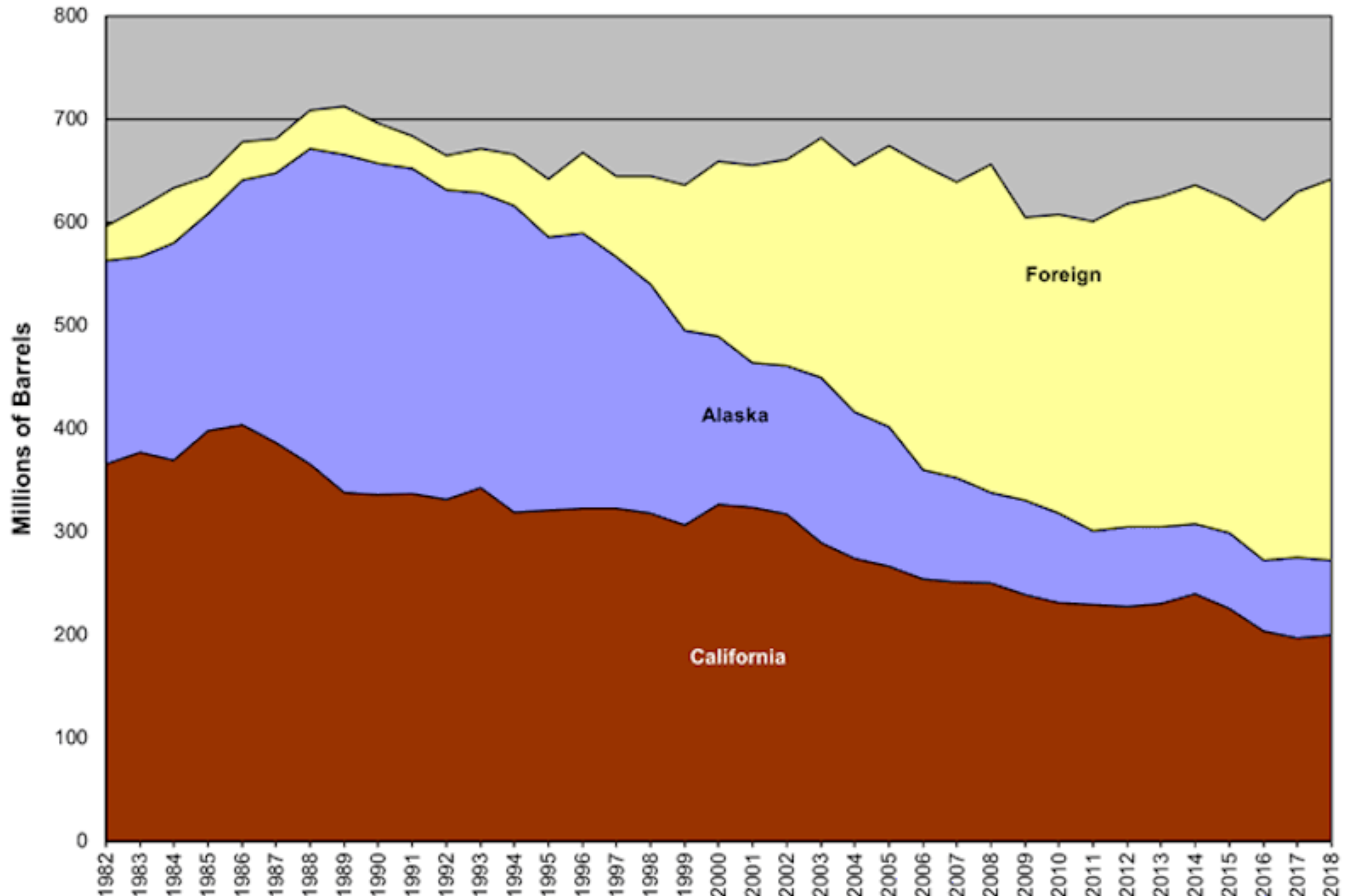


Data: BP Statistical Review 2016 Graphic: mazamascience.com

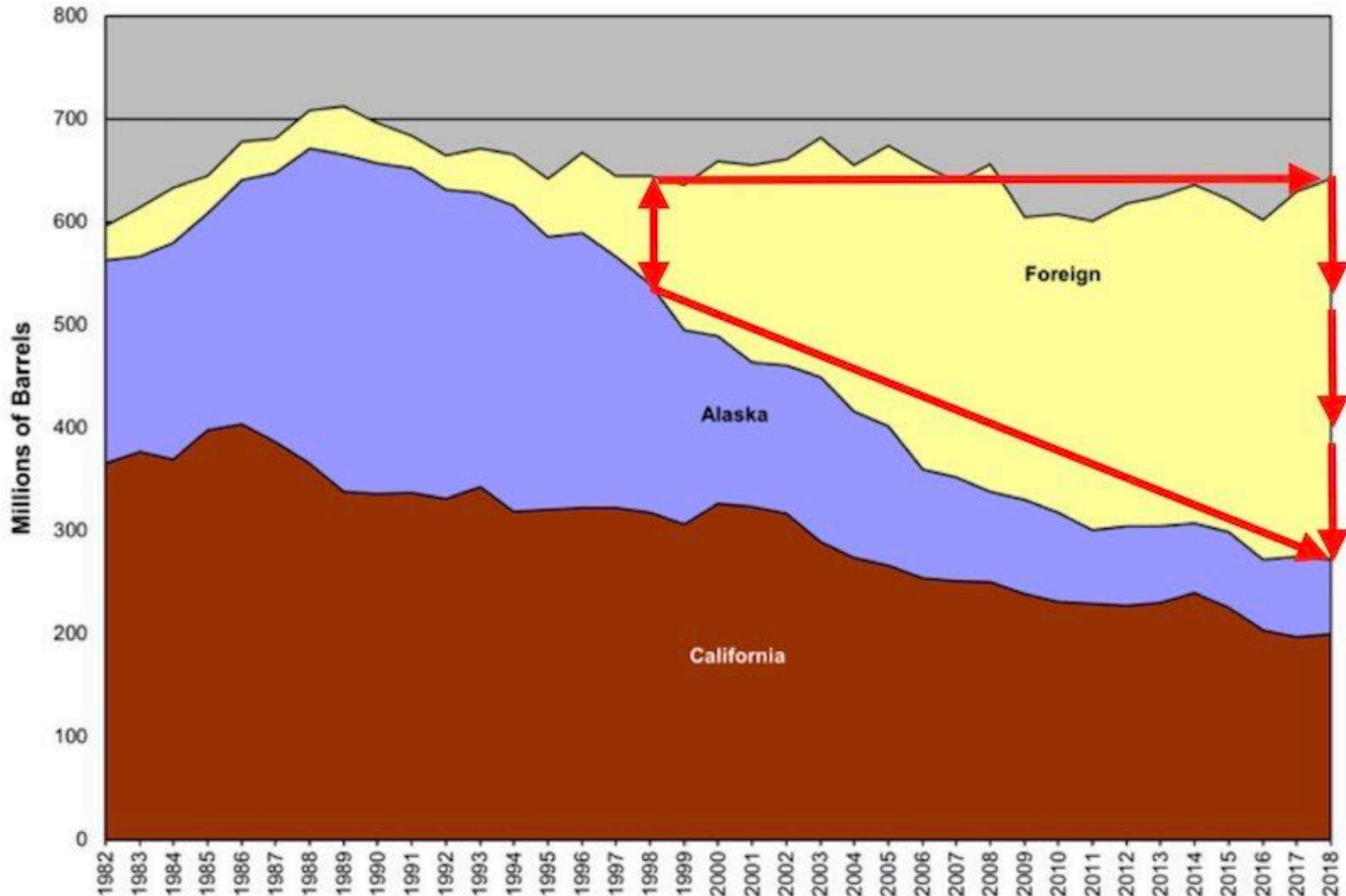
And now... meet our local member of the X 2 M Club



And now... meet our local member of the X 2 M Club



California's foreign oil imports have tripled in 20 years





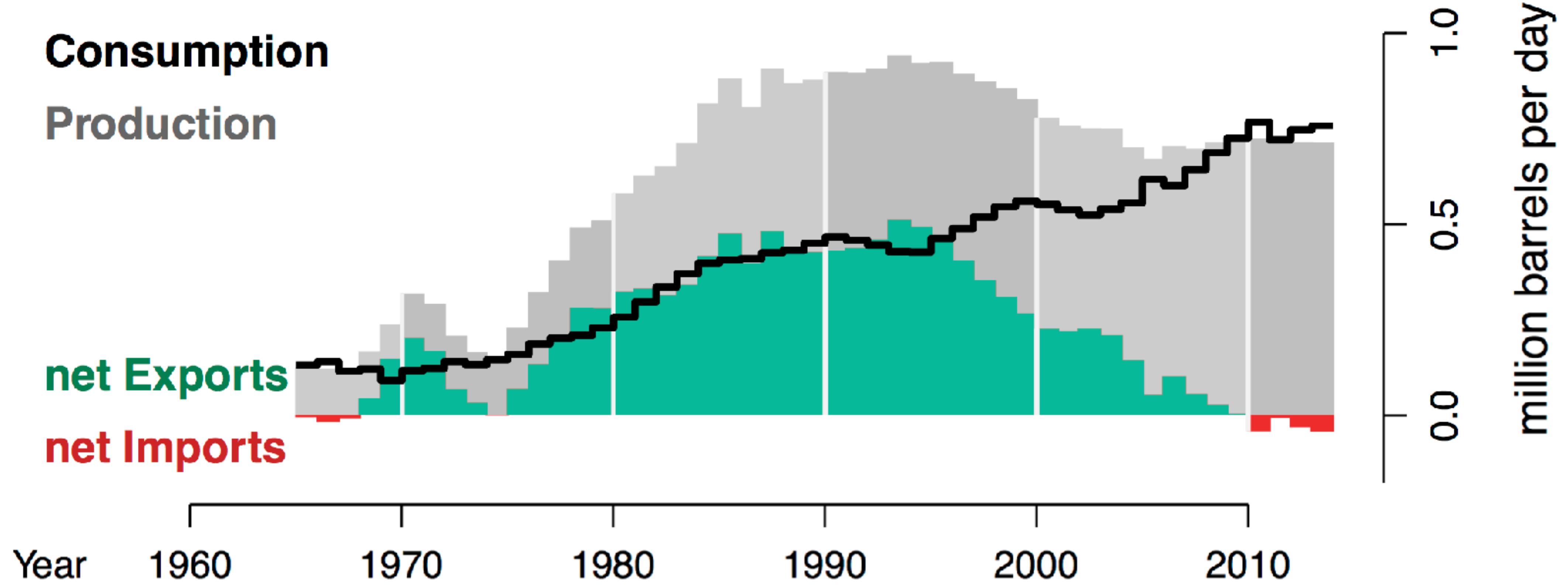
IT *IS* HARD
WALKIN'
ON THIS
STUFF.

YEP, SON,
WE HAVE MET
THE ENEMY
AND HE IS US.

Arab Spring? Energy analysis gives a very different picture

Egypt : Oil

2013 imports increased by 39. %



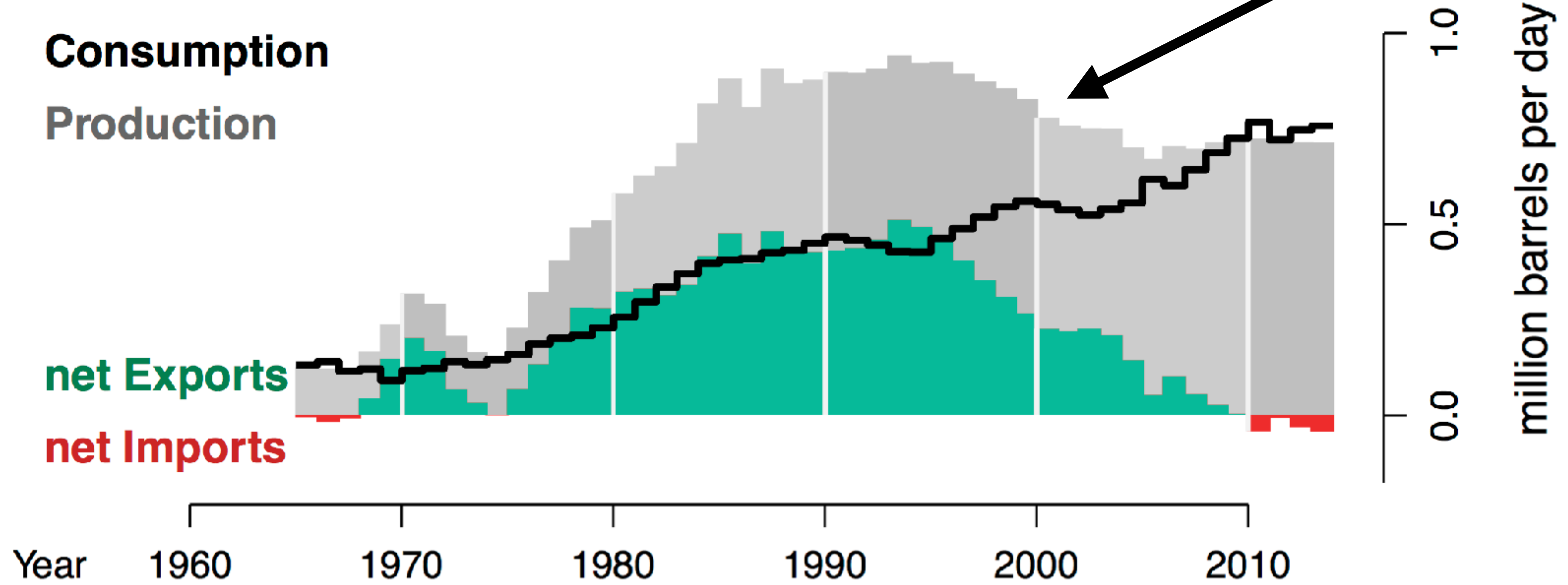
Data: BP Statistical Review 2014 Graphic: mazamascience.com

Arab Spring? Energy analysis gives a very different picture

Egypt : Oil

2013 imports increased by 39. %

Declining
"Production"



Data: BP Statistical Review 2014 Graphic: mazamascience.com

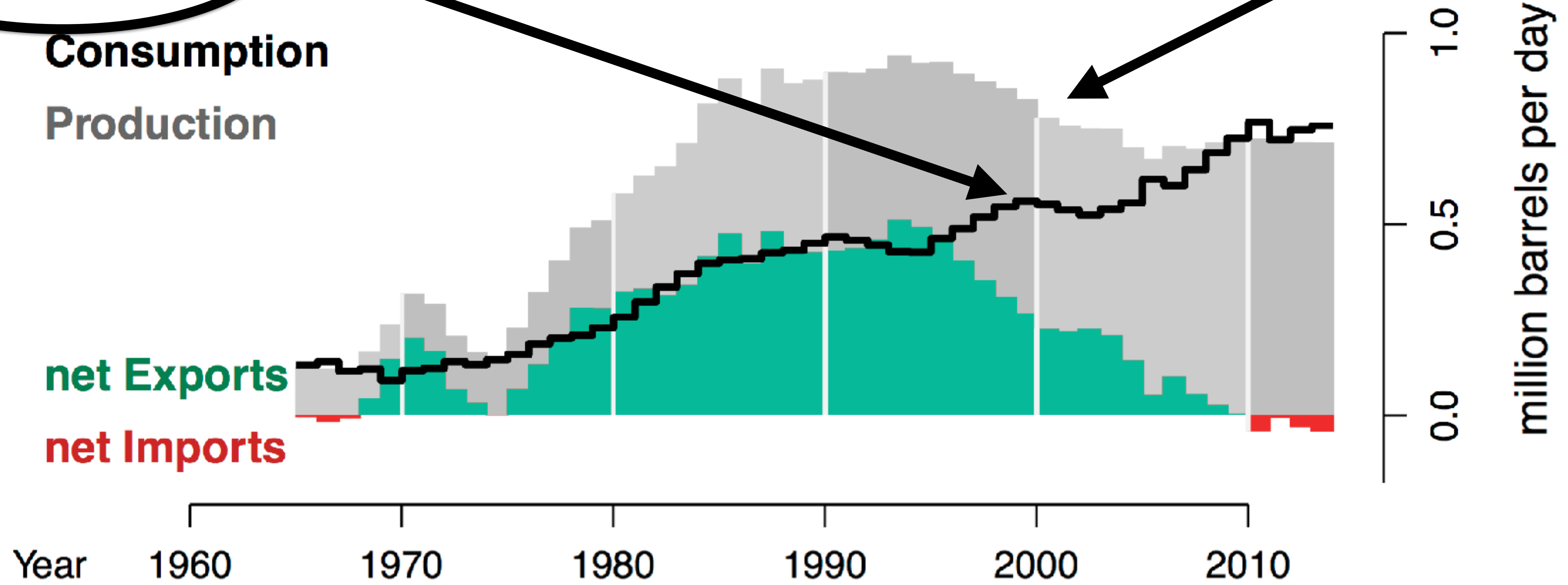
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Rising consumption

Declining "Production"



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Arab Spring? Energy analysis gives a very different picture

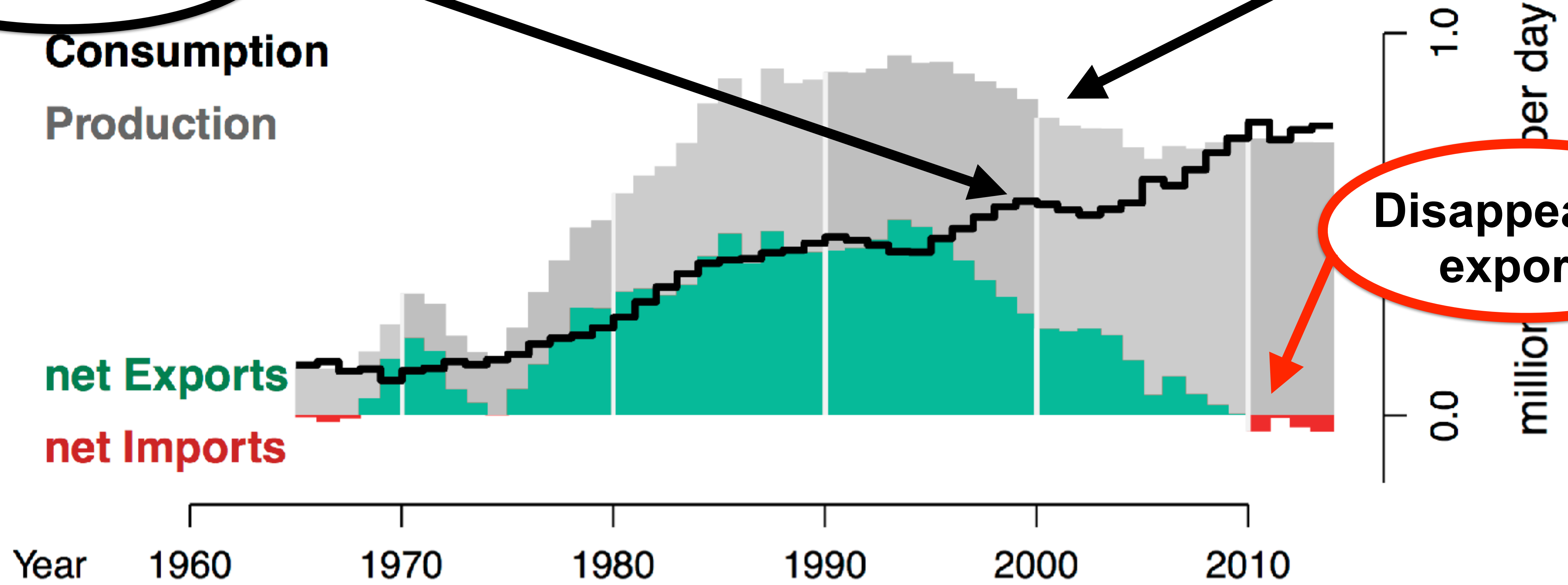
Egypt : Oil

2013 imports increased by 39. %

Rising consumption

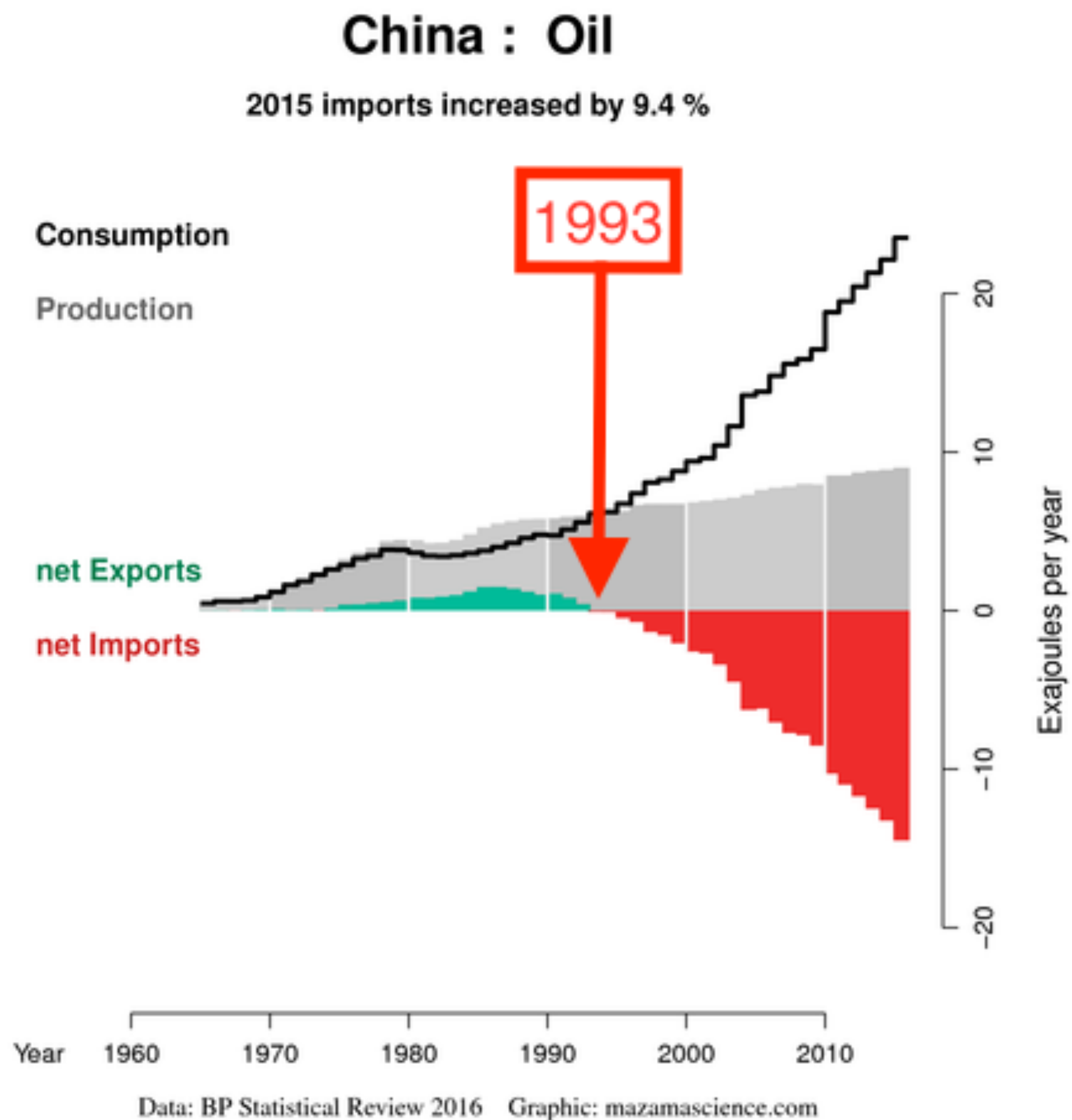
Declining "Production"

Disappearing exports

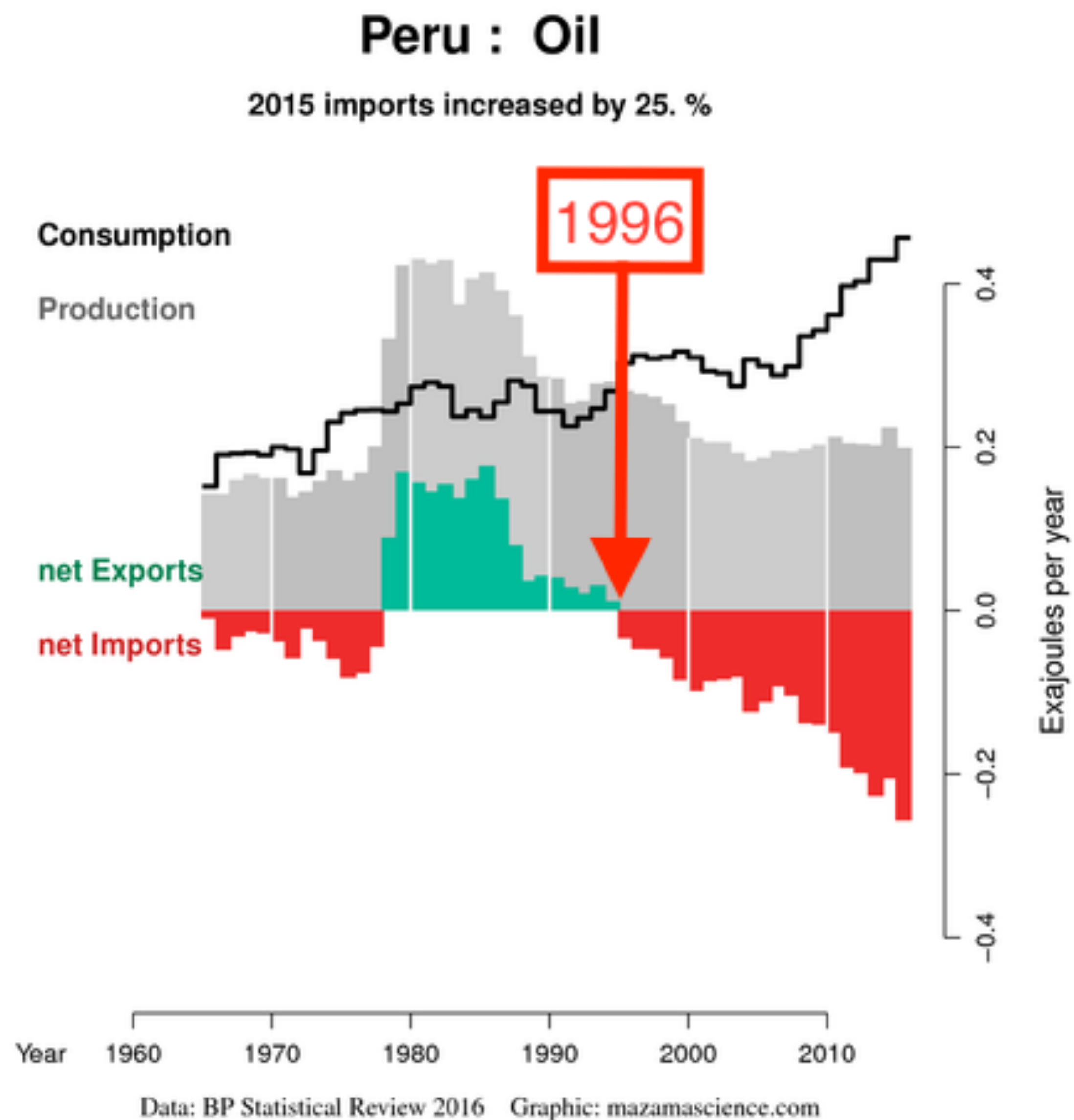


Data: BP Statistical Review 2014 Graphic: mazamascience.com

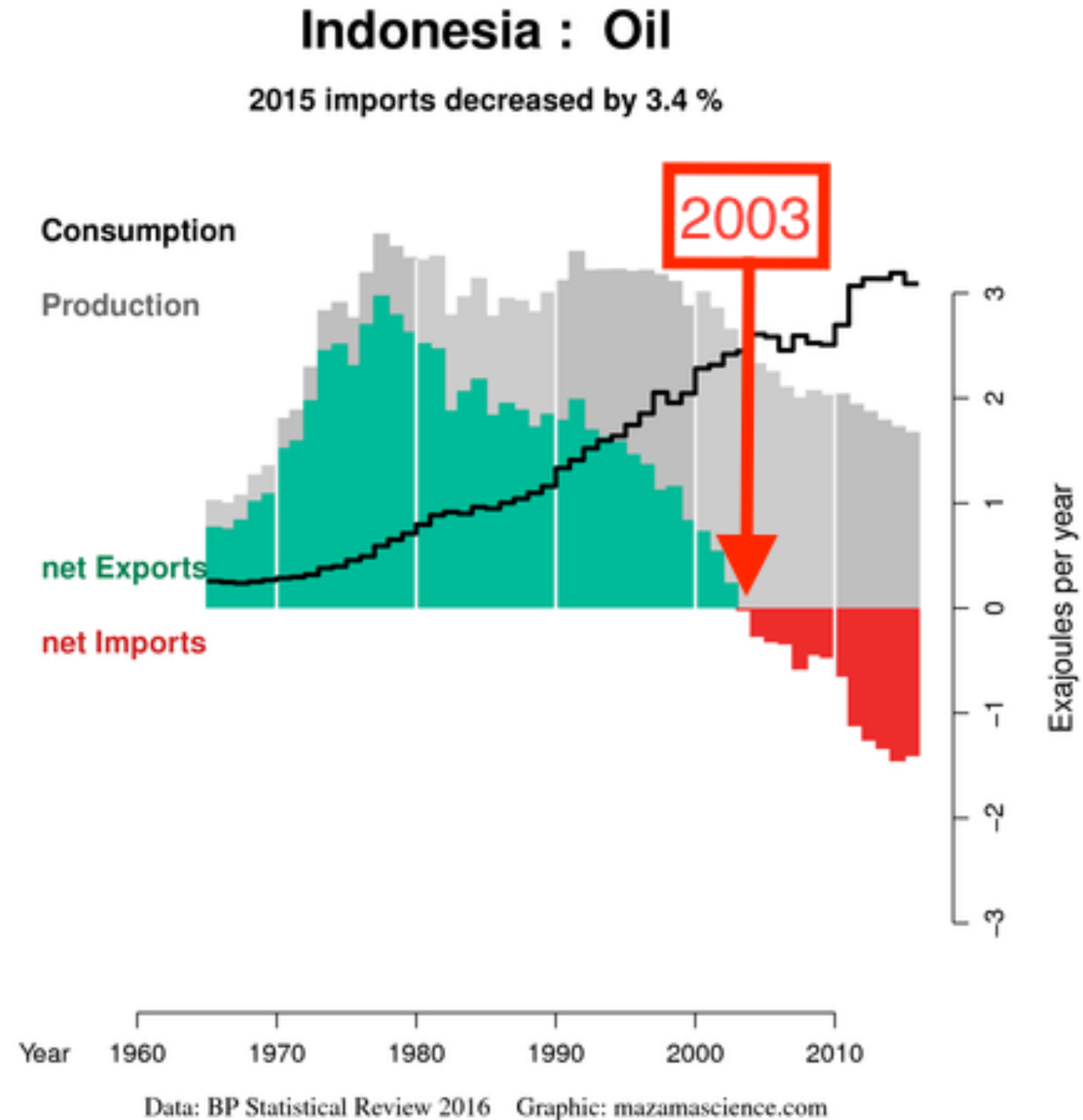
The X2M Club has many distinguished members



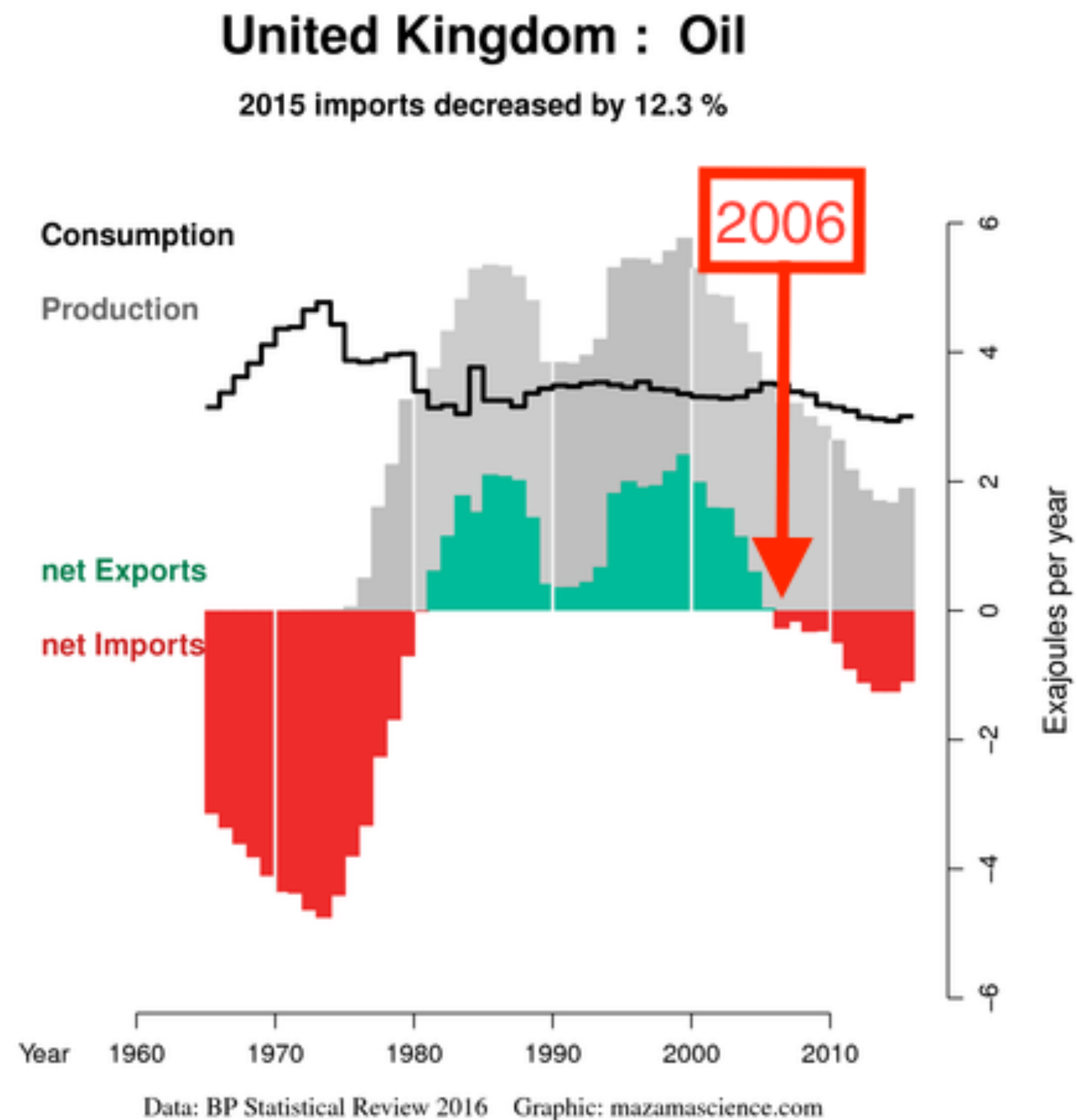
The X2M Club has many distinguished members



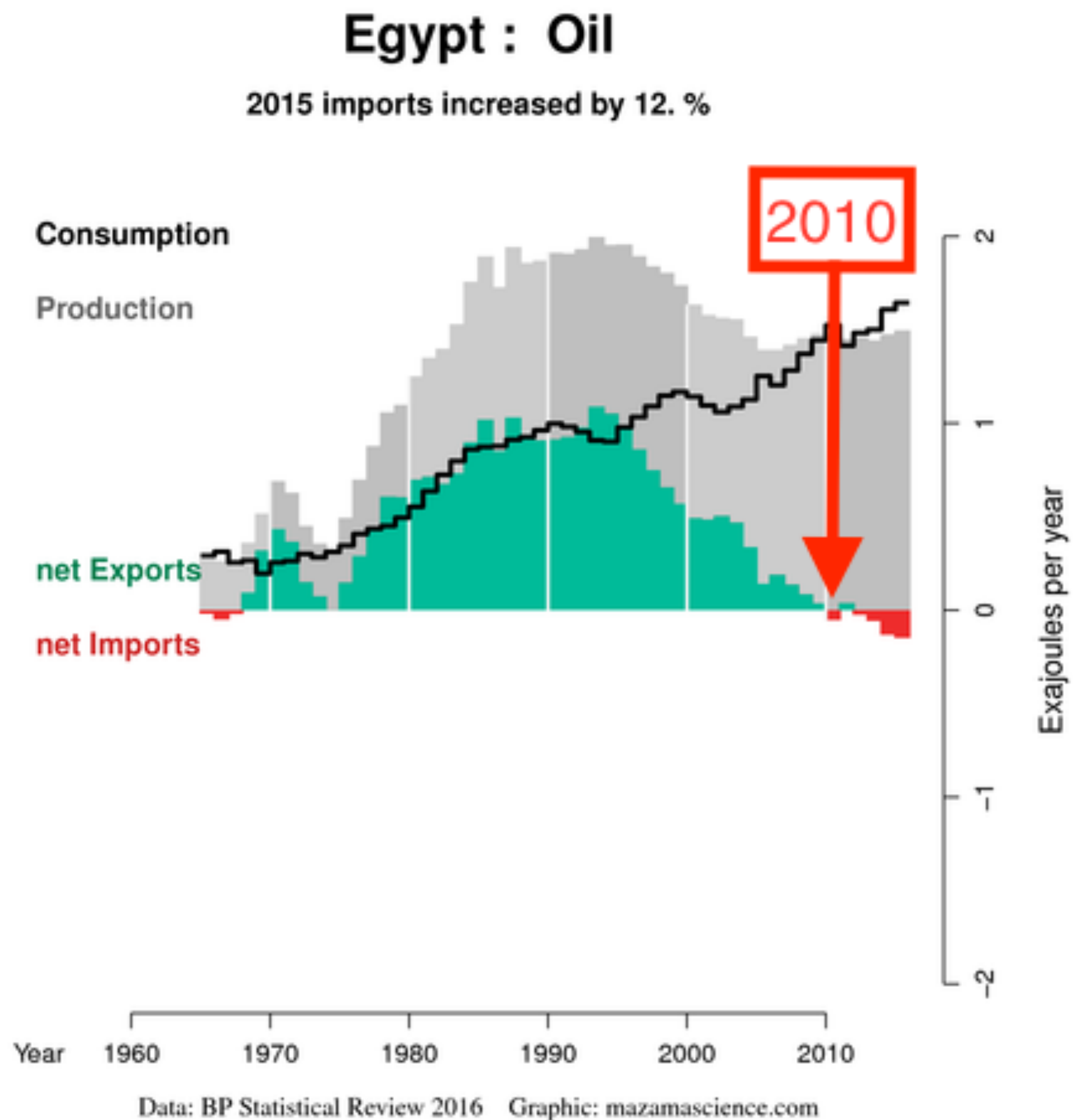
The X2M Club has many distinguished members



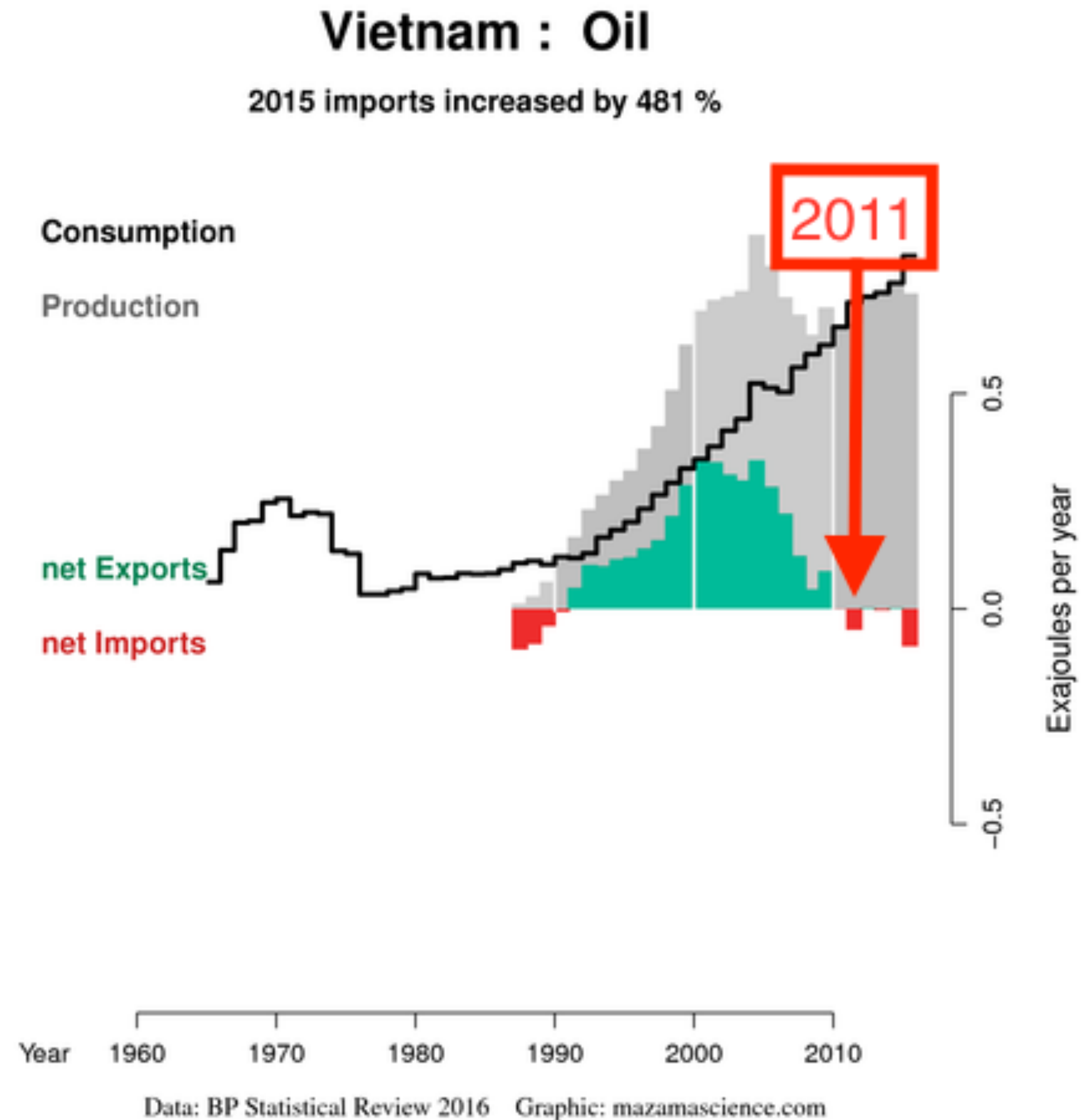
The X2M Club has many distinguished members



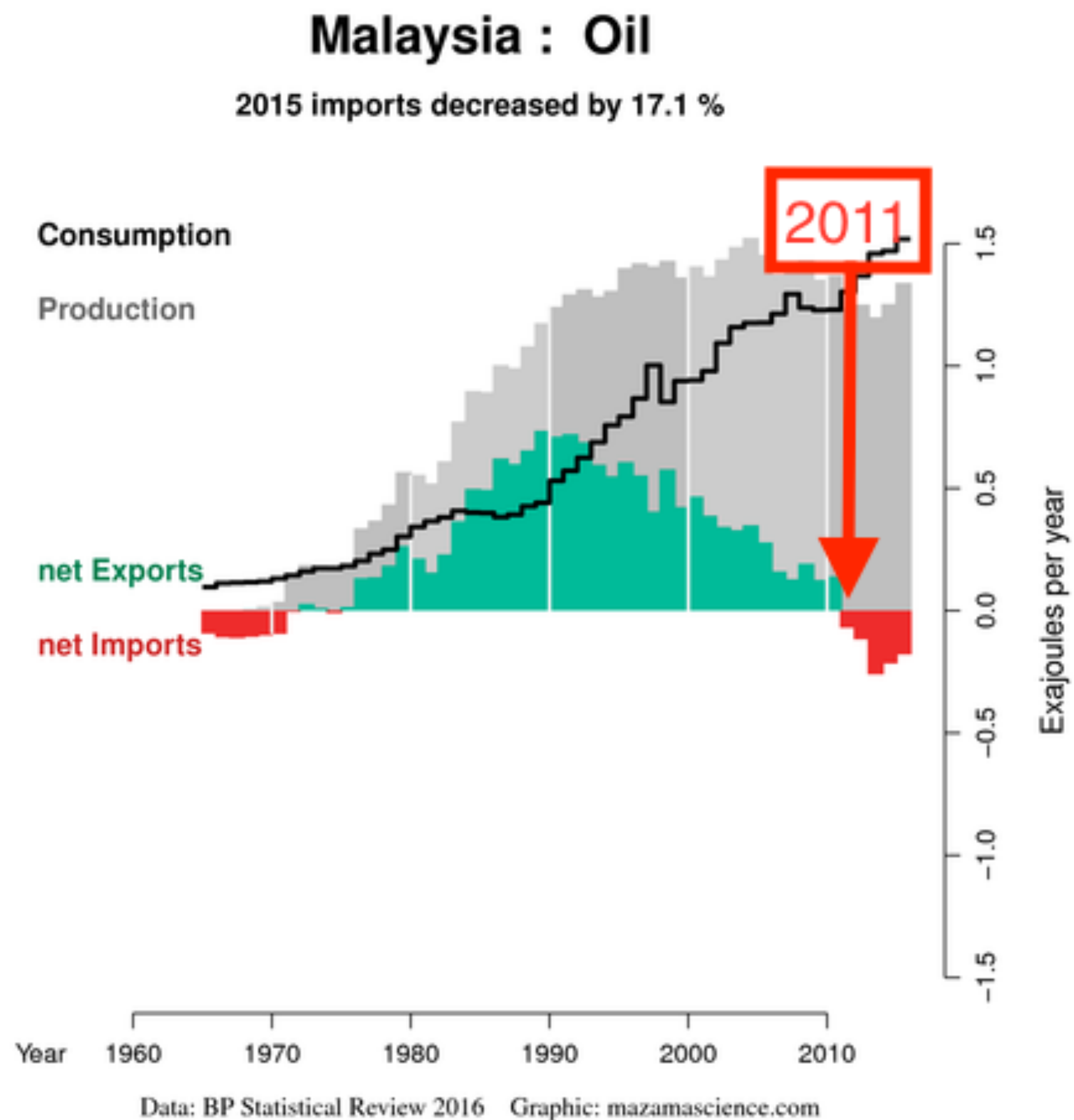
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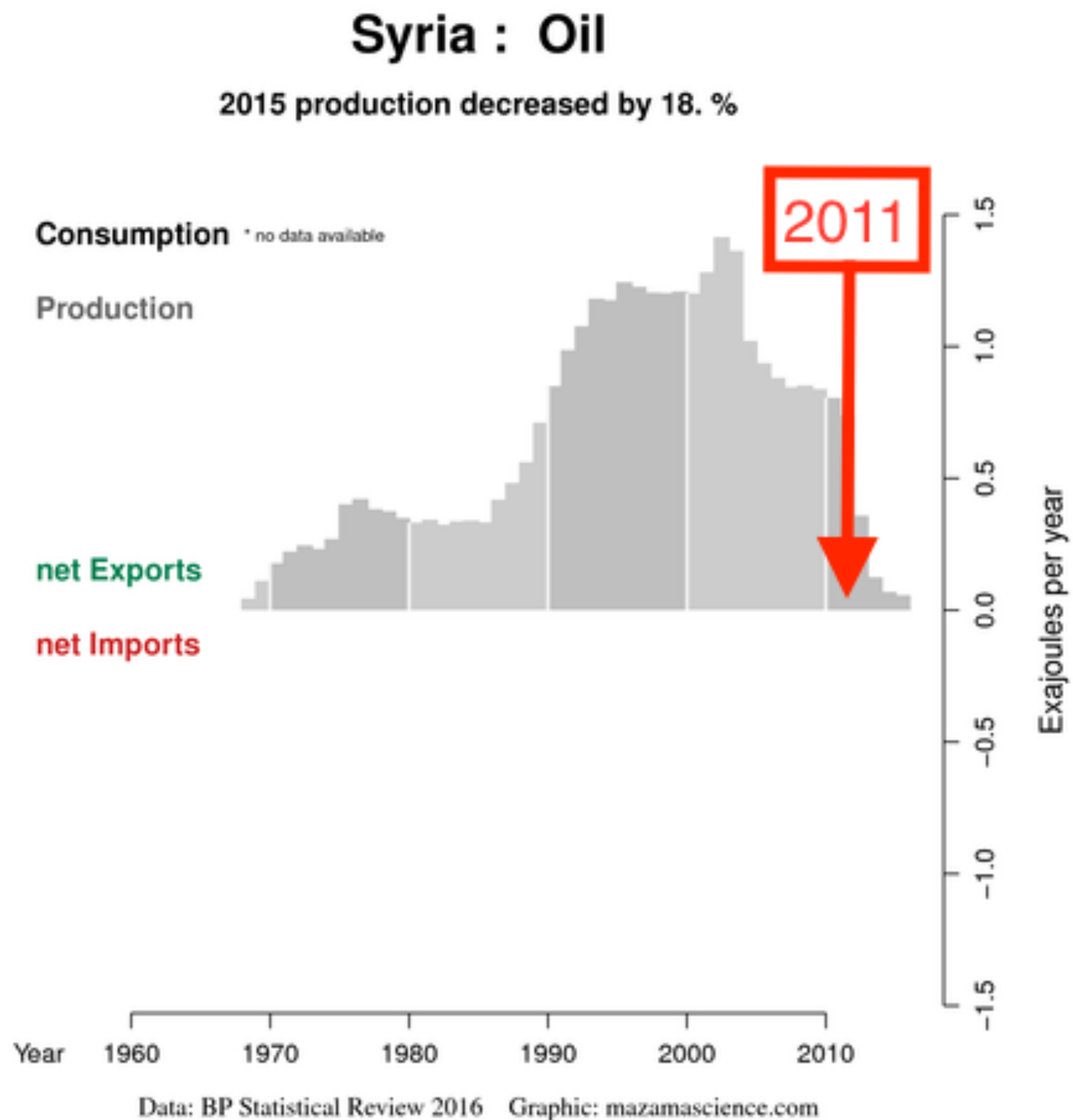
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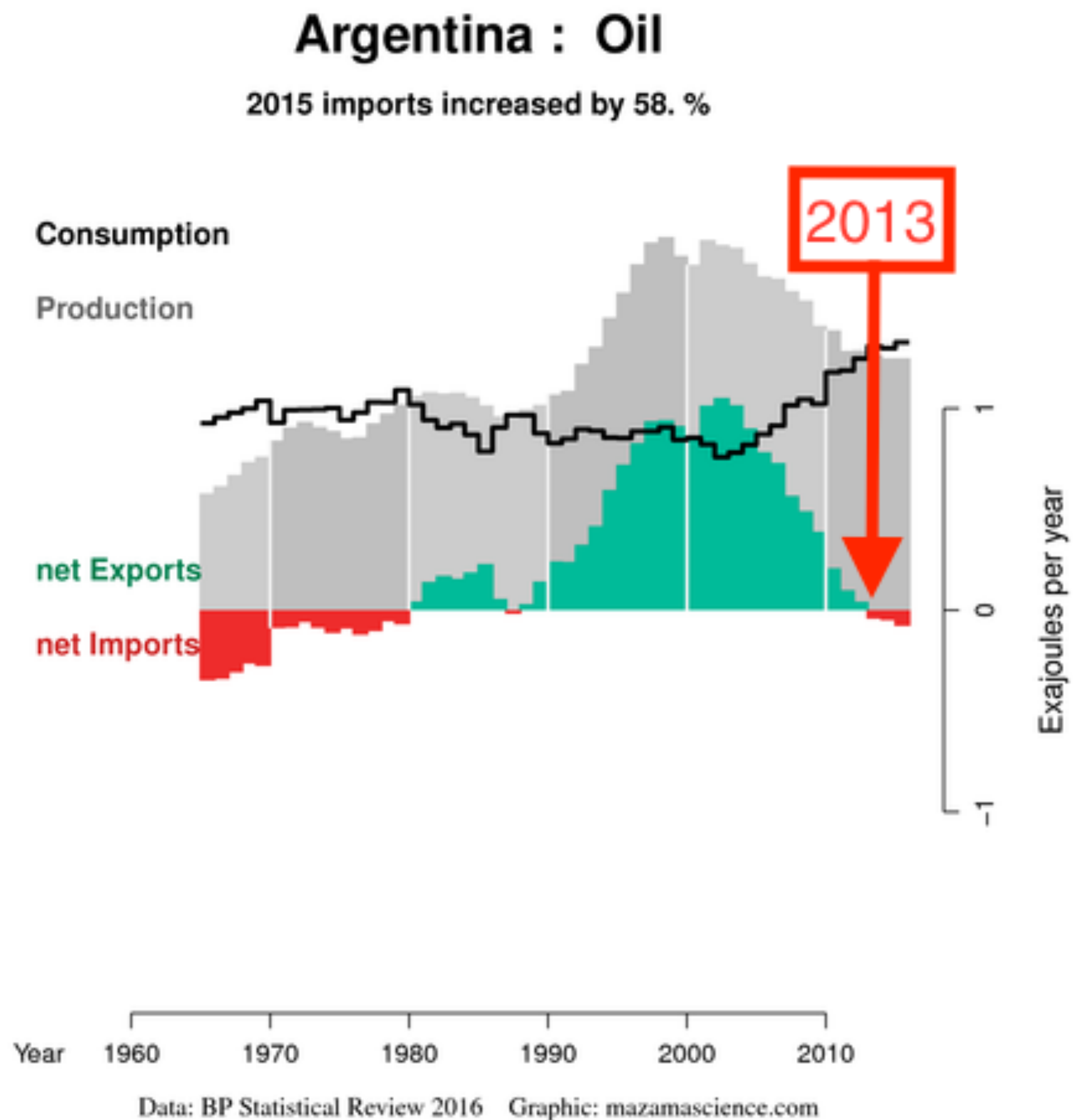
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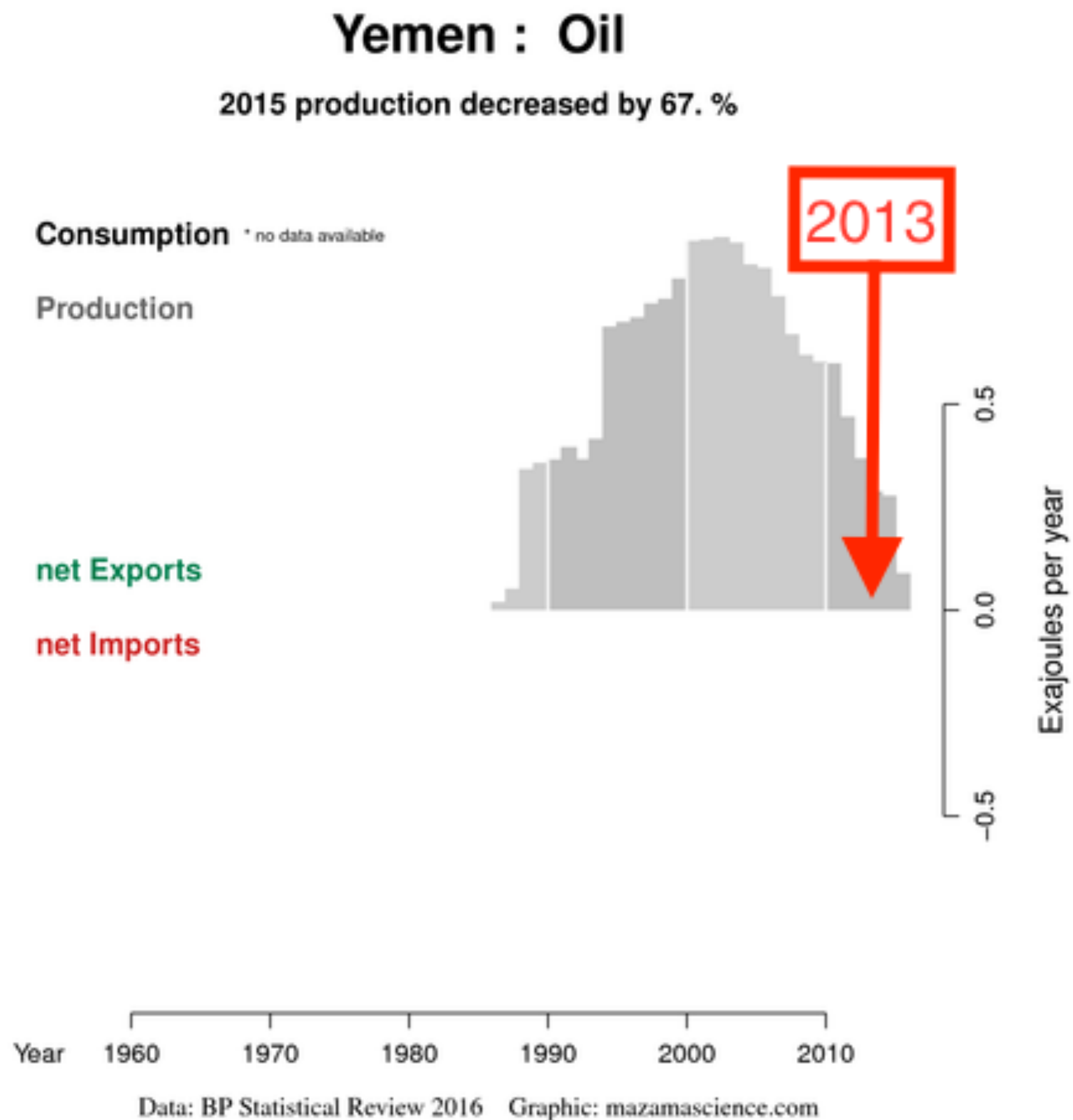
The X2M Club has many distinguished members



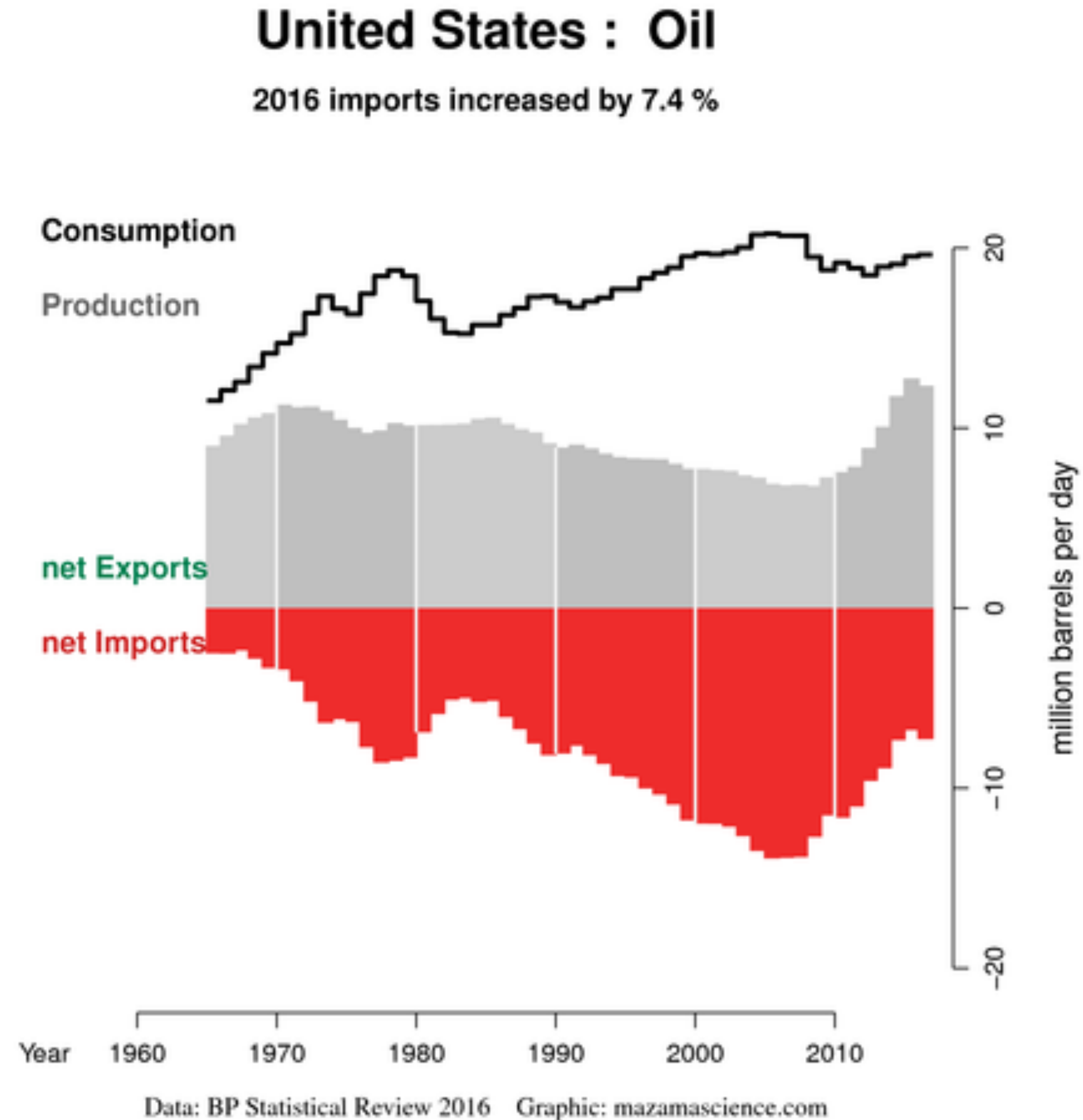
The X2M Club has many distinguished members



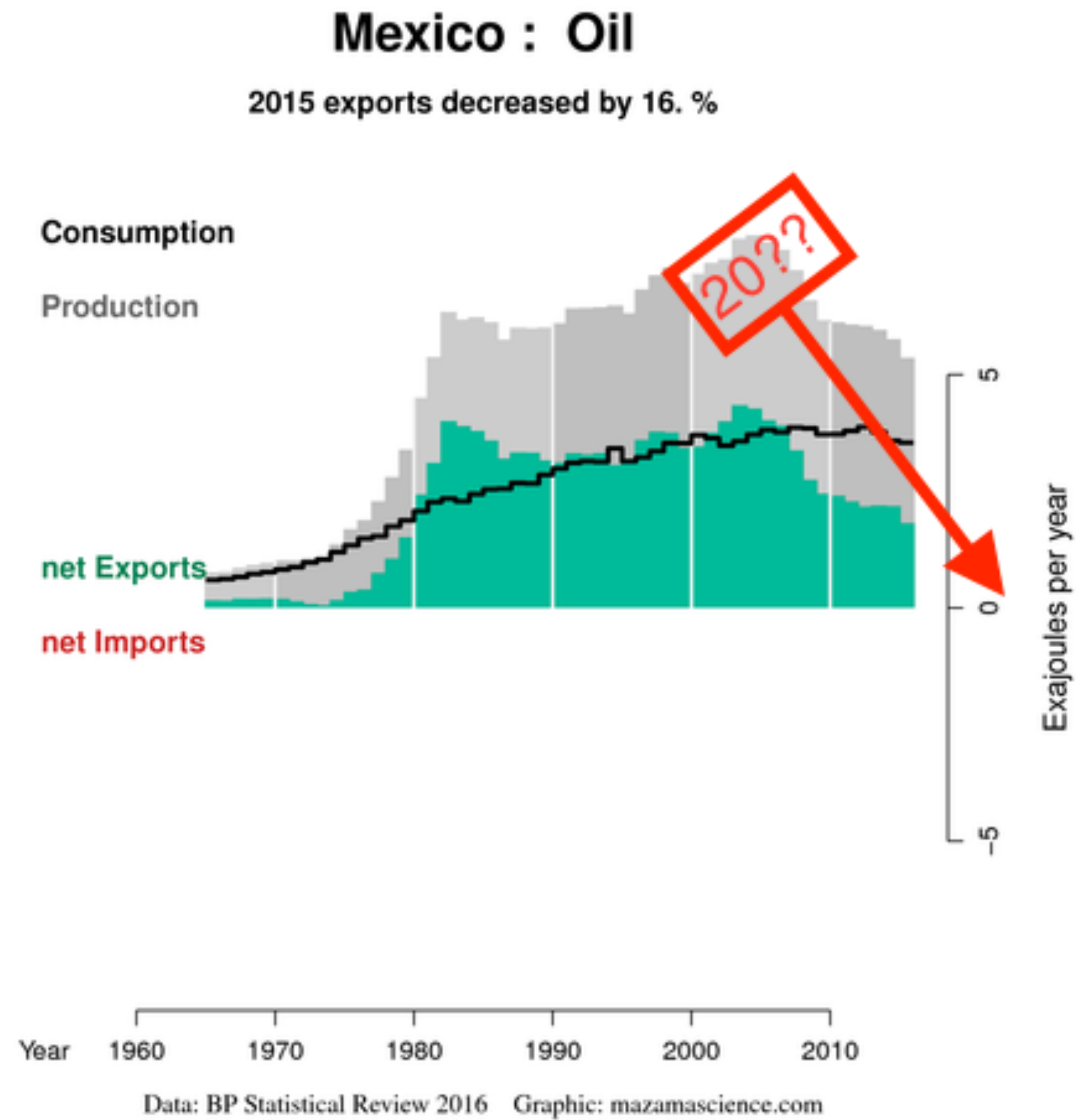
The X2M Club has many distinguished members



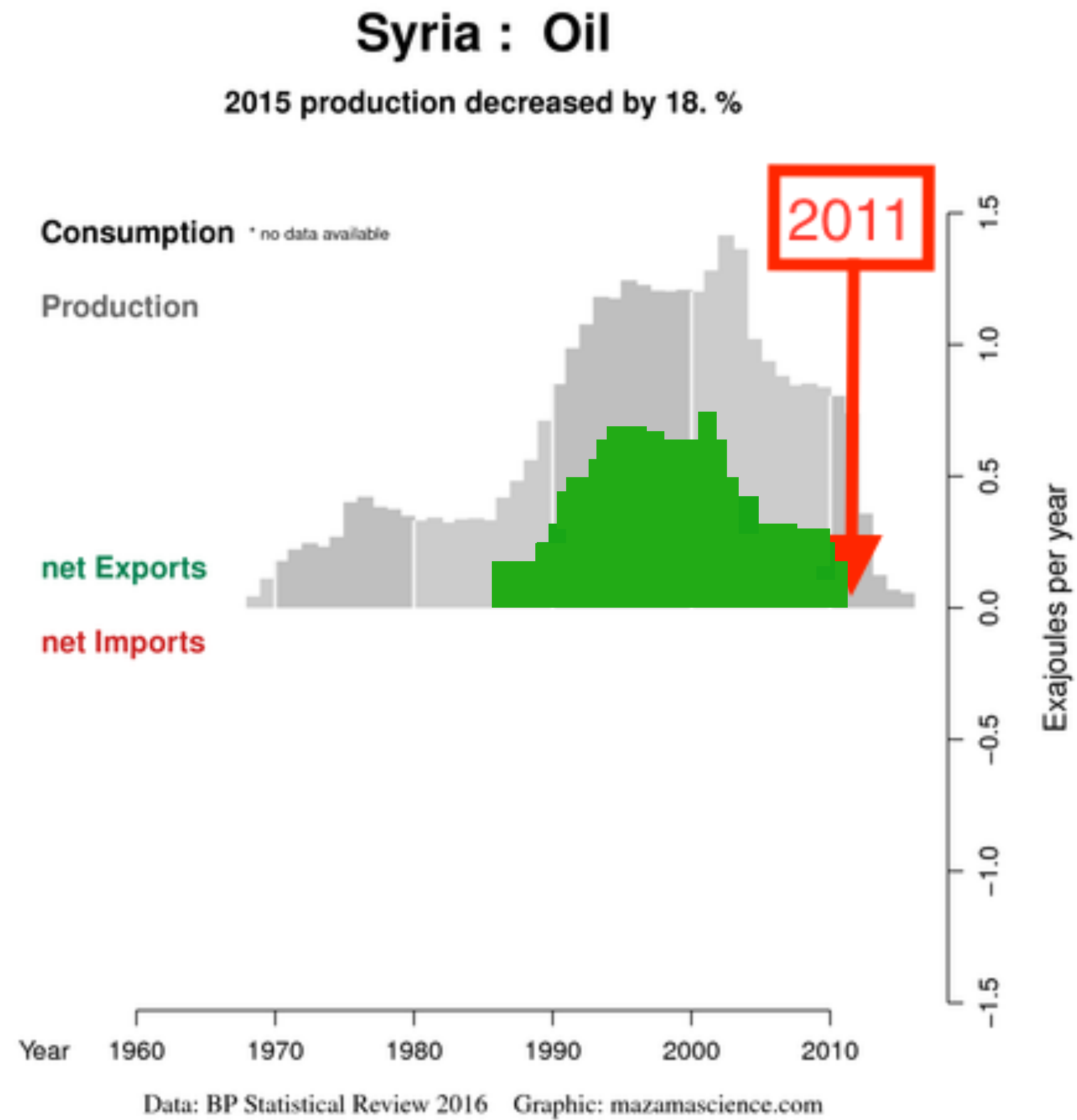
And the founding member of the X2M Club was...



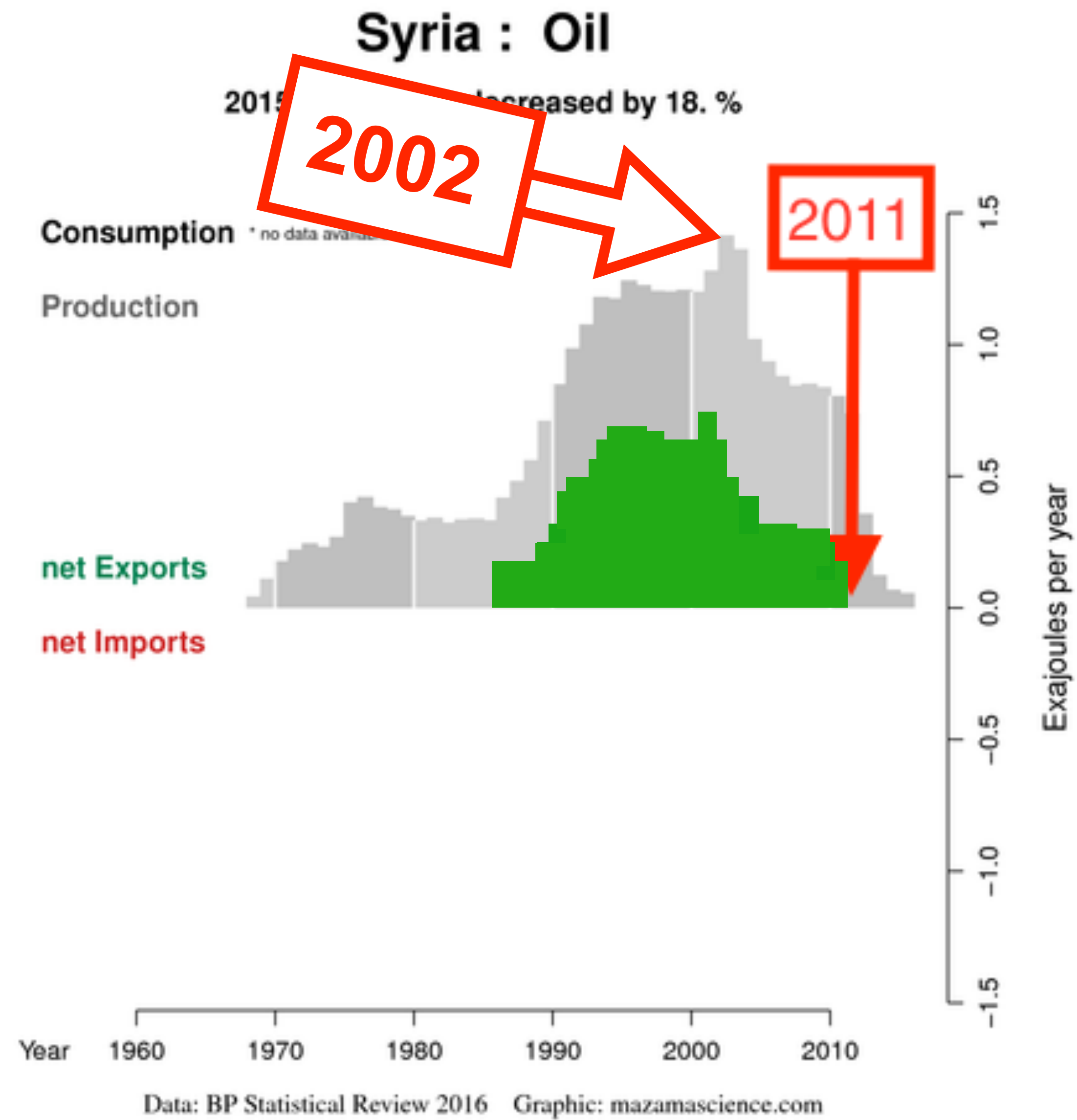
... and more countries are lining up to join the club



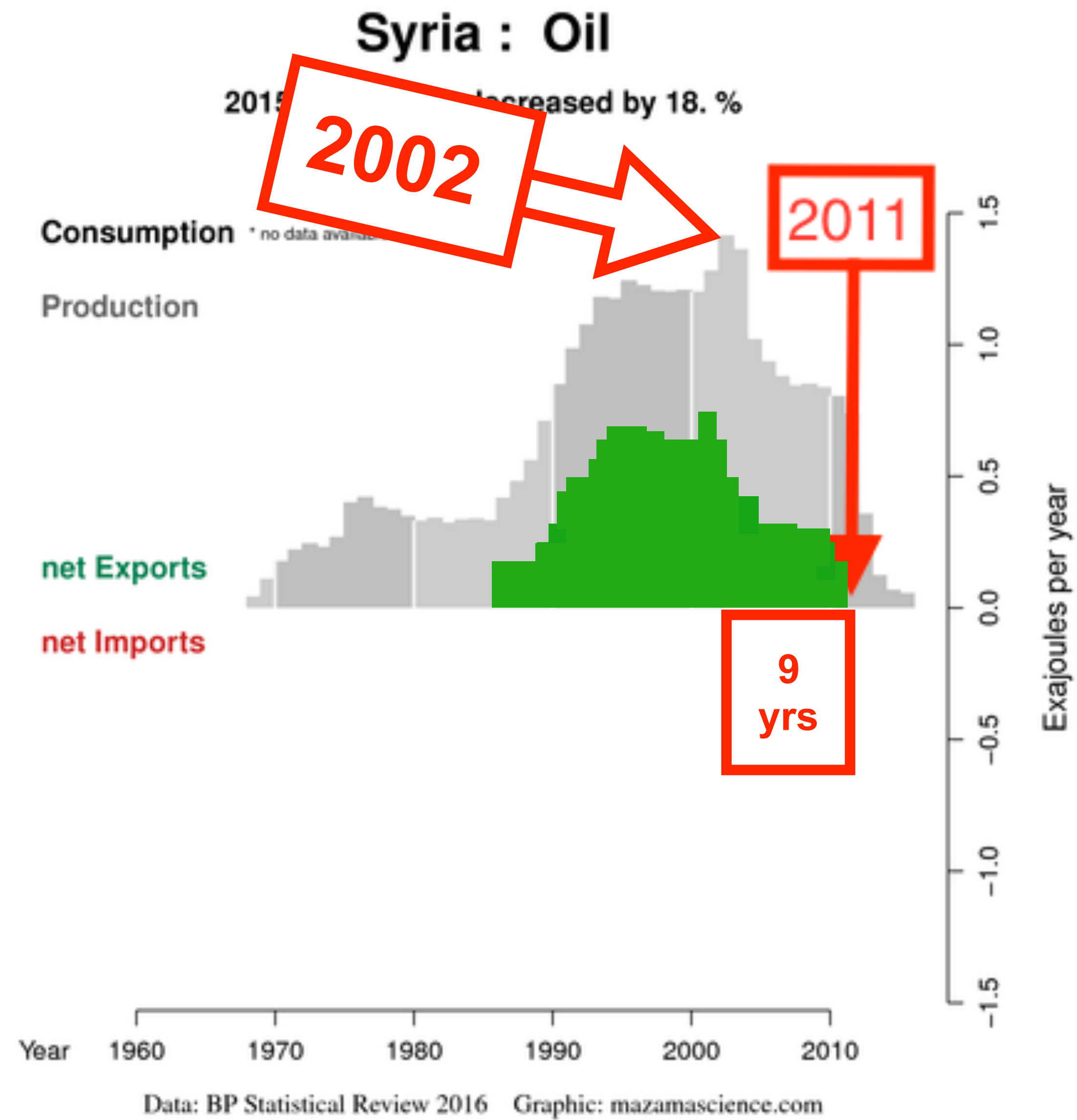
If we dare to look, our climate change poster child is Syria



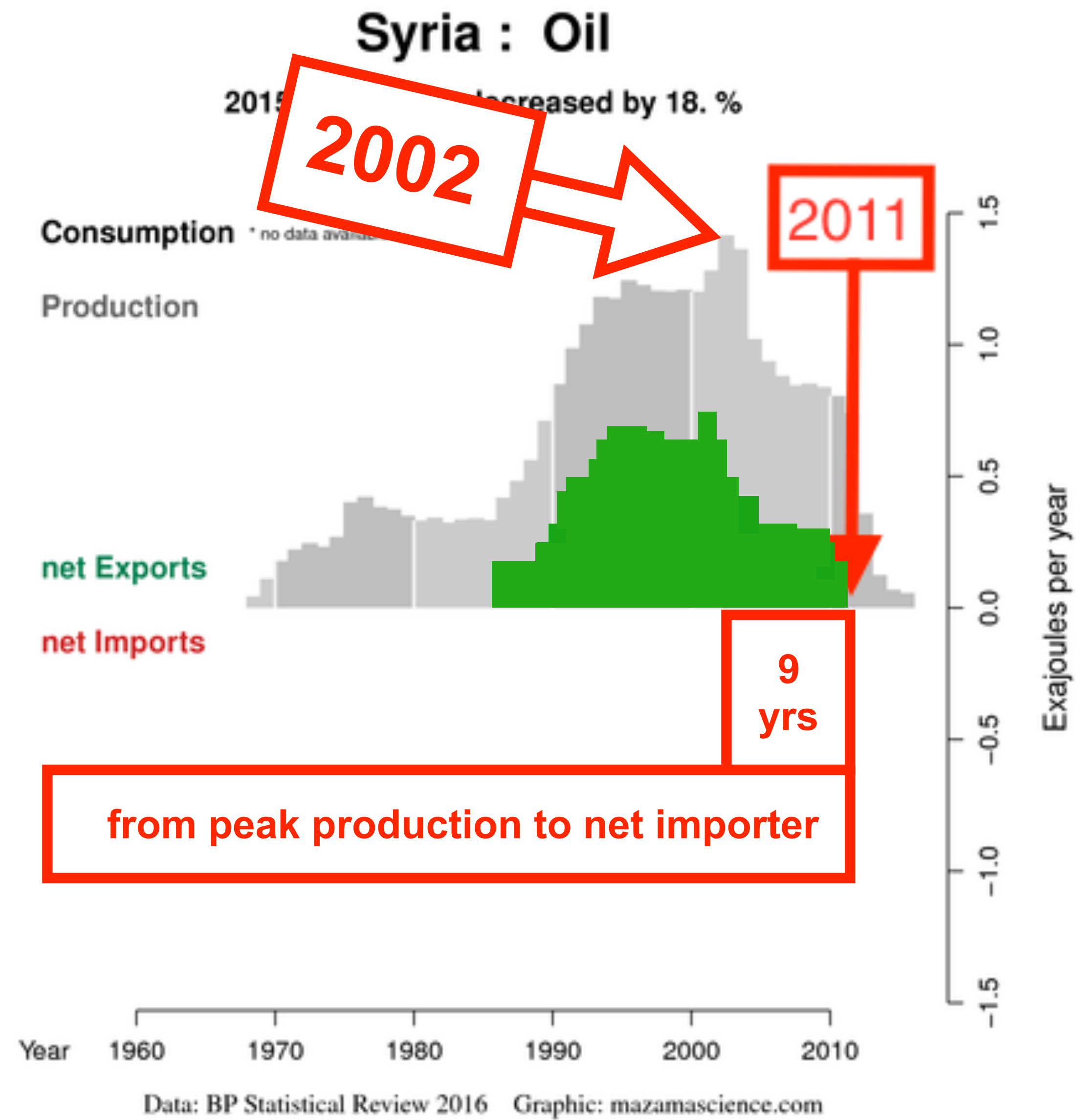
If we dare to look, our climate change poster child is Syria



If we dare to look, our climate change poster child is Syria



If we dare to look, our climate change poster child is Syria



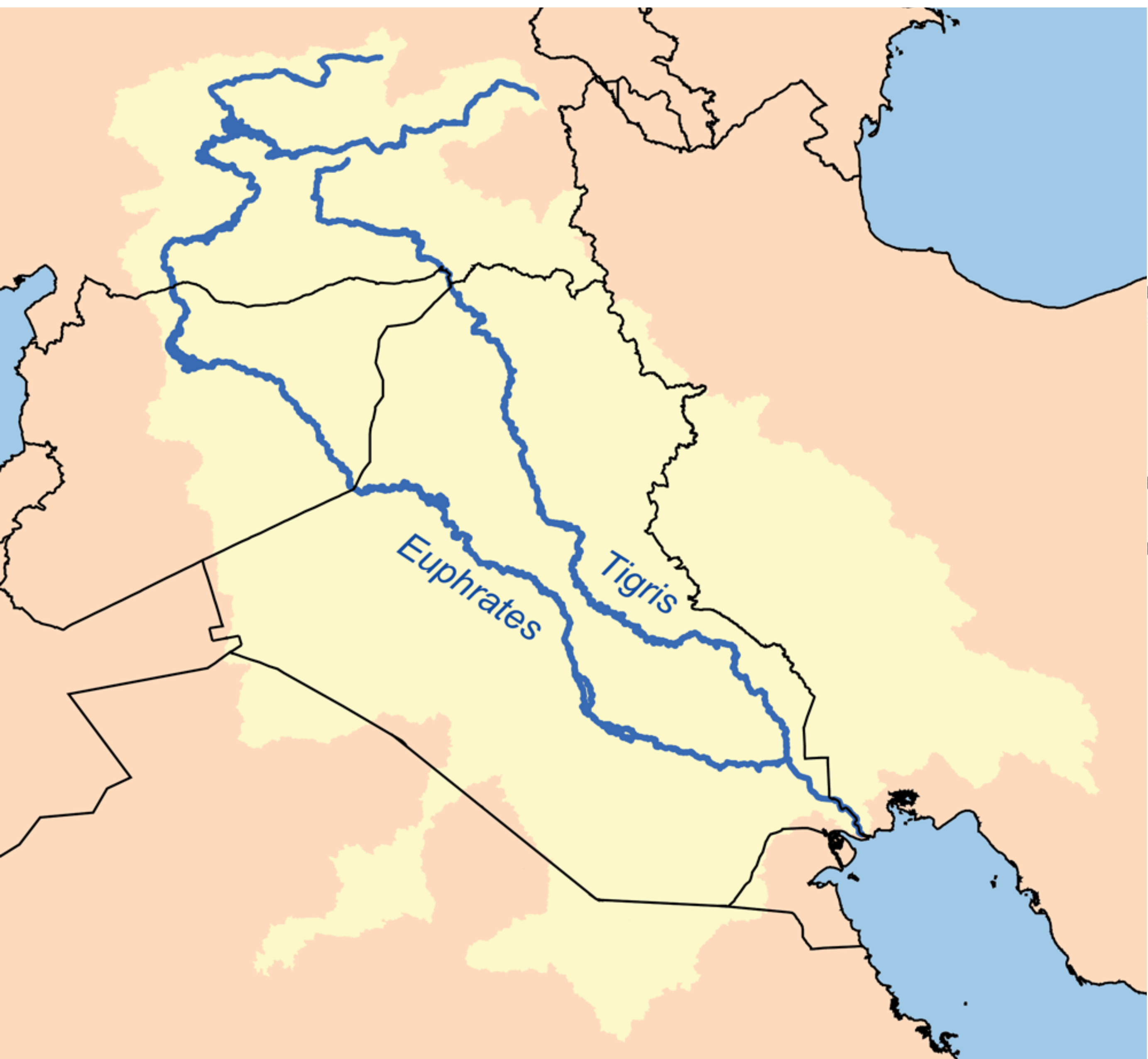
The Tigris-Euphrates basin crosses several borders



... and Syrian farms are impacted by dams upstream



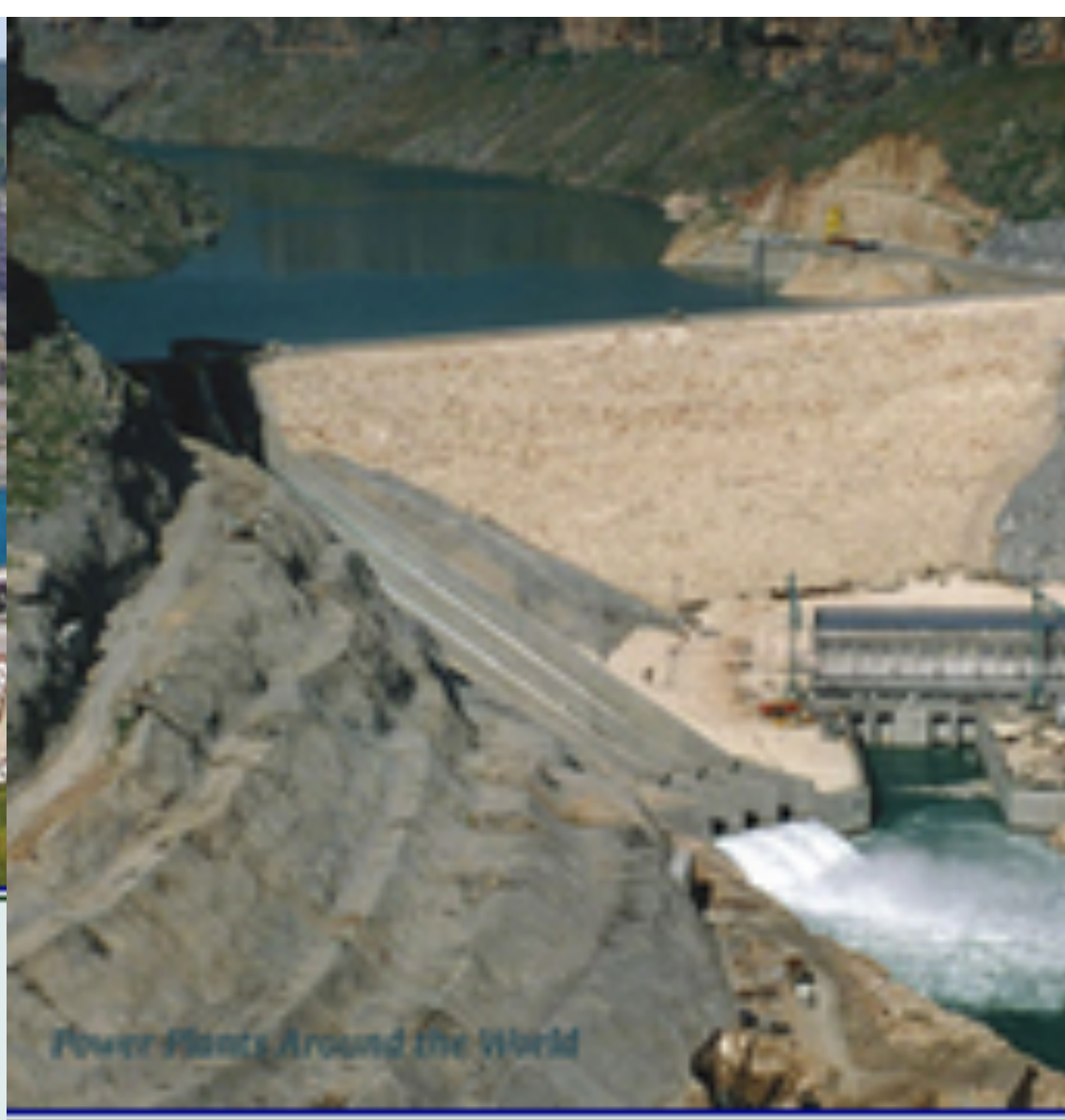
... and Syrian farms are impacted by dams upstream



... and Syrian farms are impacted by dams upstream



... and Syrian farms are impacted by dams upstream



Ataturk

Location: Sanliurfa
 Operator: EUAS
 Configuration: 8 X 300 MW Francis
 Operation: 1992-1993
 T/G supplier: SZEW, ABB
 EPC: Dolsar, ATA Insaat

Quick facts: Ataturk Dam is the largest in a series of 22 dams and 19 hydroelectric plants built on the Euphrates and Tigris rivers as part of the massive irrigation and hydroelectricity scheme. The dam is one of the world's largest earth-and-rock dams measuring 184m high and 1,820m long.

Photograph courtesy of Palet Insaat
 Re-posted 1 Dec 2010

Dicle

Location: Diyarbakir
 Operator: EUAS
 Configuration: 2 X 55 MW
 Operation: 1991-2001
 T/G supplier: Resita, Temelsu
 EPC: Romenergo, Kiska

Quick facts: The 87m multipurpose dam is located 50km north of Diyarbakir city where the Dicle and Dabni rivers join and become the Tigris. The reservoir has an area of 24 km² and is part of the GAP project.

Photograph courtesy of Türkiye Müteahhitlik
 Posted 9 Dec 2006

Karakaya

Location: Diyarbakir
 Operator: EUAS
 Configuration: 6 X 300 MW Francis
 Operation: 1987-1989
 T/G supplier: Sulzer Escher Wyss, ABB
 EPC: Electrowatt

Photograph copyright by and courtesy of VA
 Posted 16 Feb 2002

Karkamis

Location: Kahramanmaraş
 Operator: EUAS
 Configuration: 6 X 32 MW Bulb
 Operation: 1999-2000
 T/G supplier: Voith, Elin
 EPC: Temelsu, Yuksel, Verbundplan

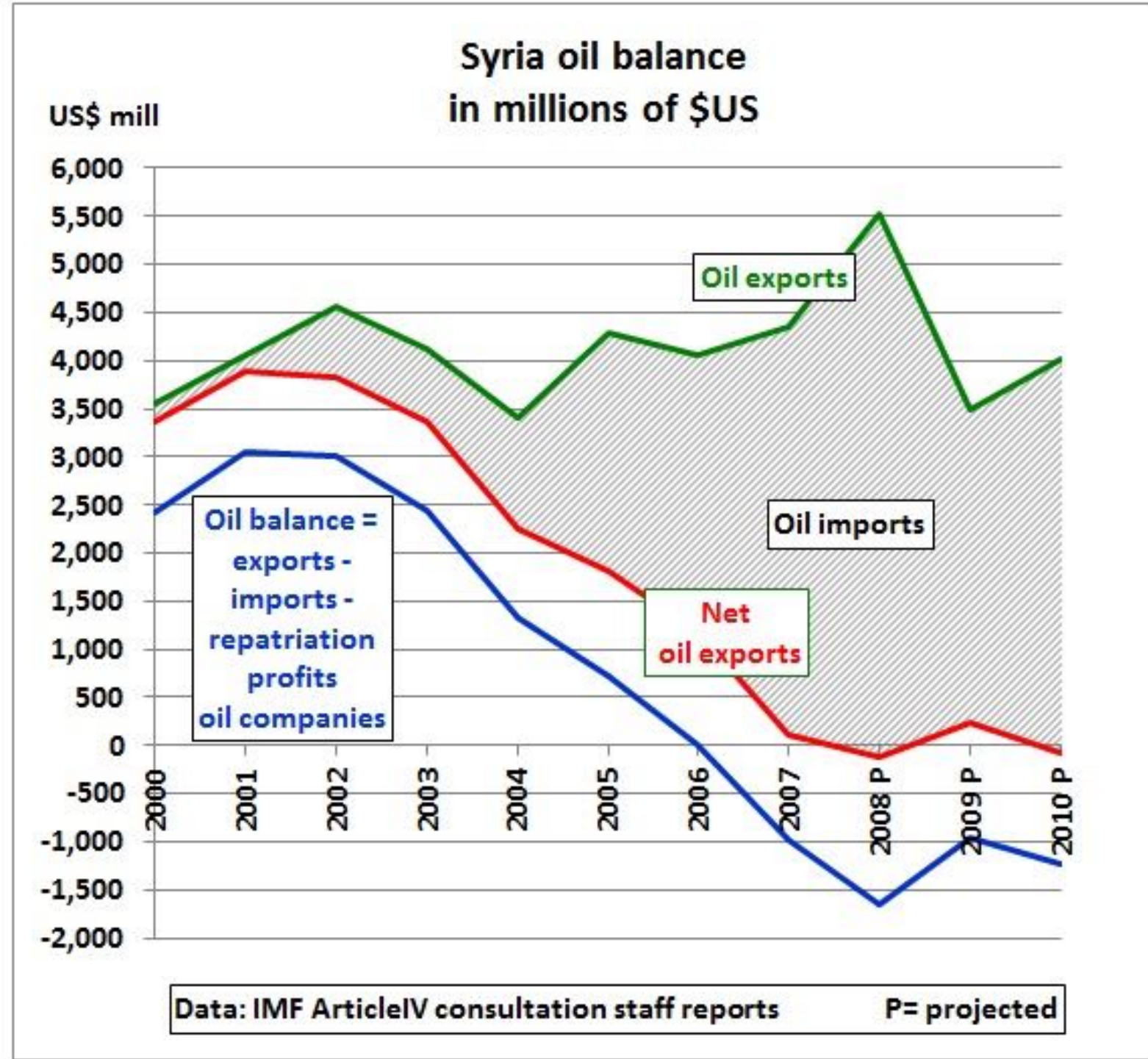
Quick facts: Karkamis is the second of the lower Euphrates schemes within the Southeastern Anatolia Project. The clay-cored dam has a crest elevation of 344m and a crest length of 1,647m.

Photograph courtesy of Yuksel Insaat AS
 Posted 4 Aug 2004

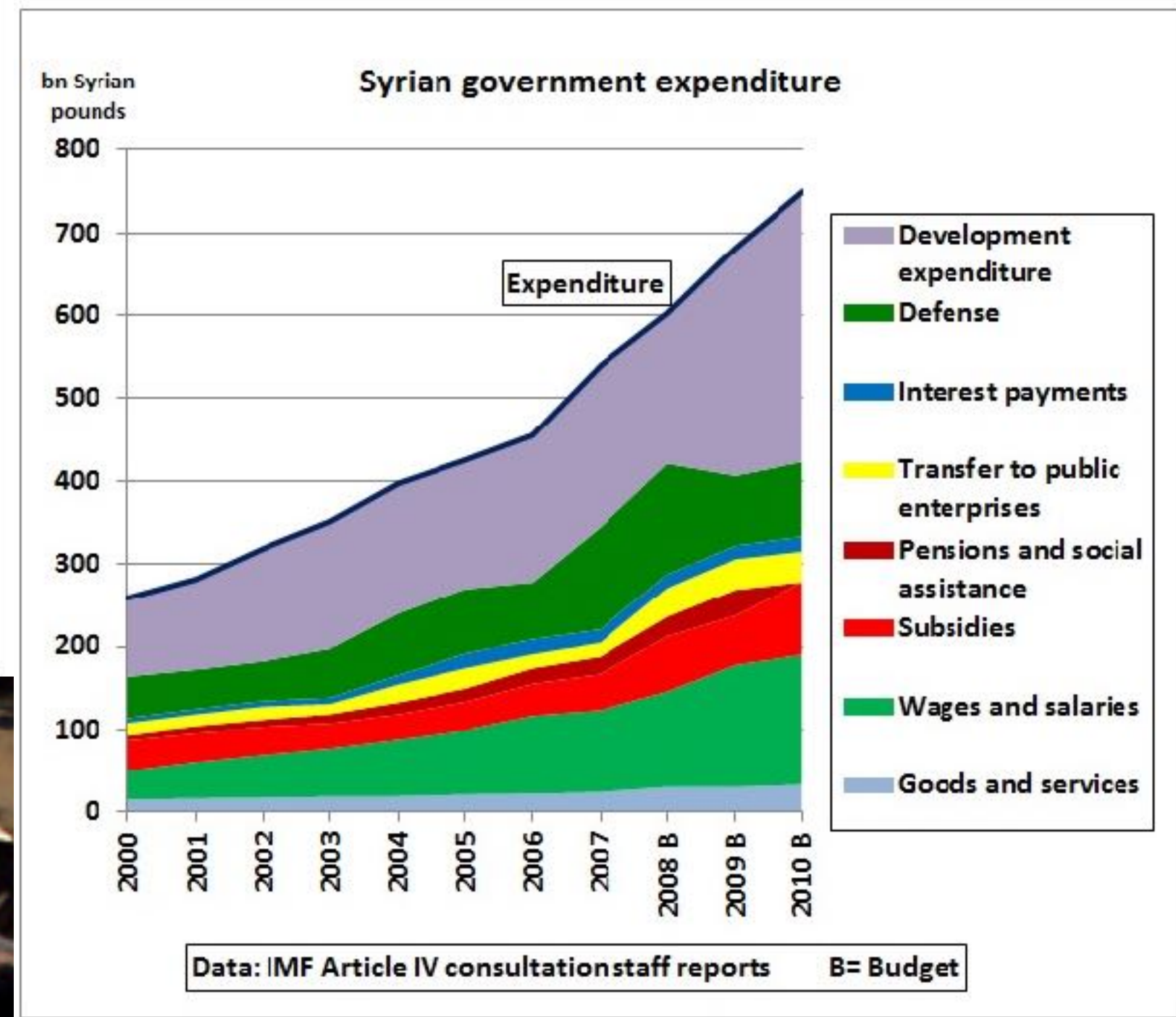
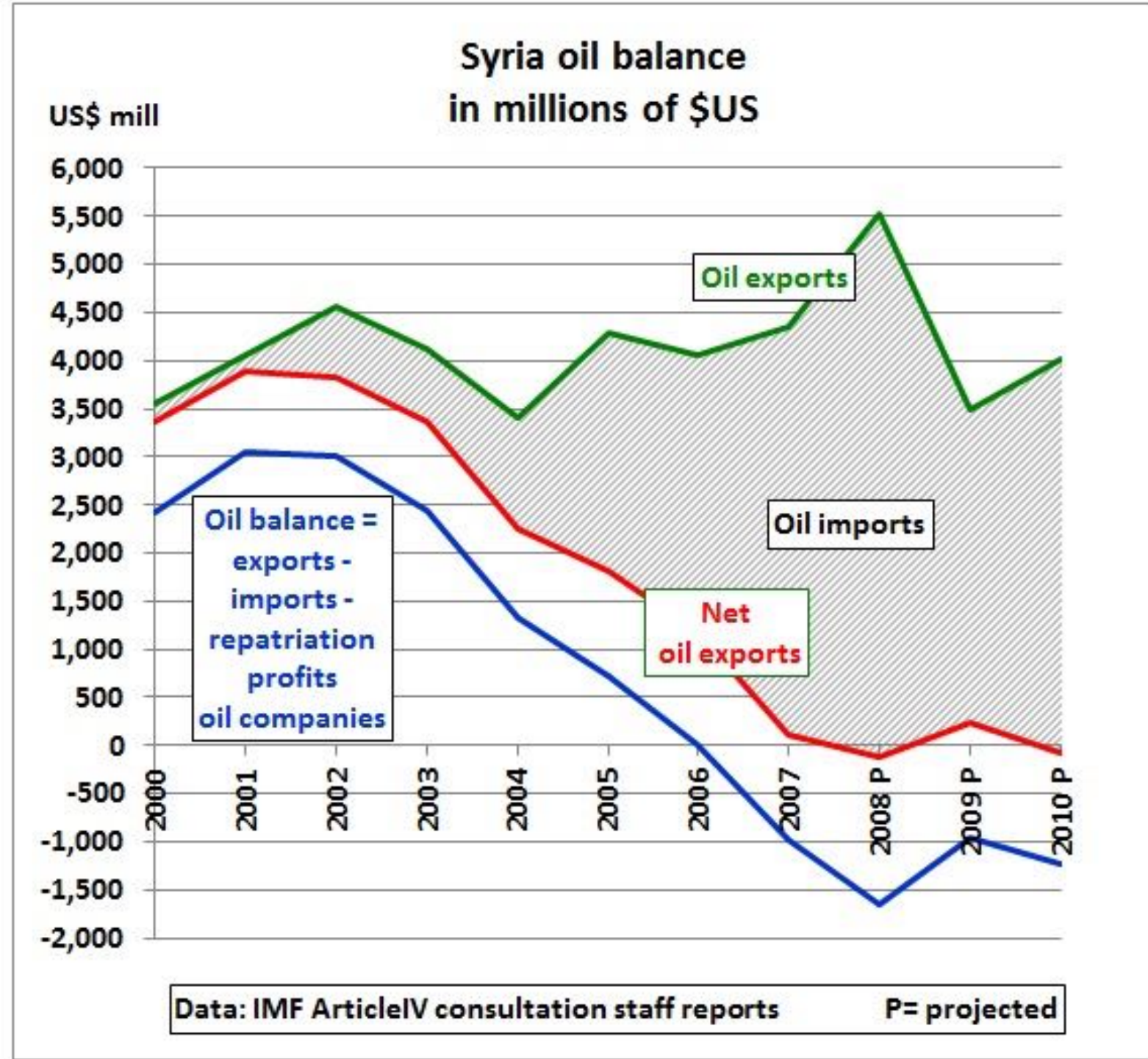
They had the good life, but *now it's gone*



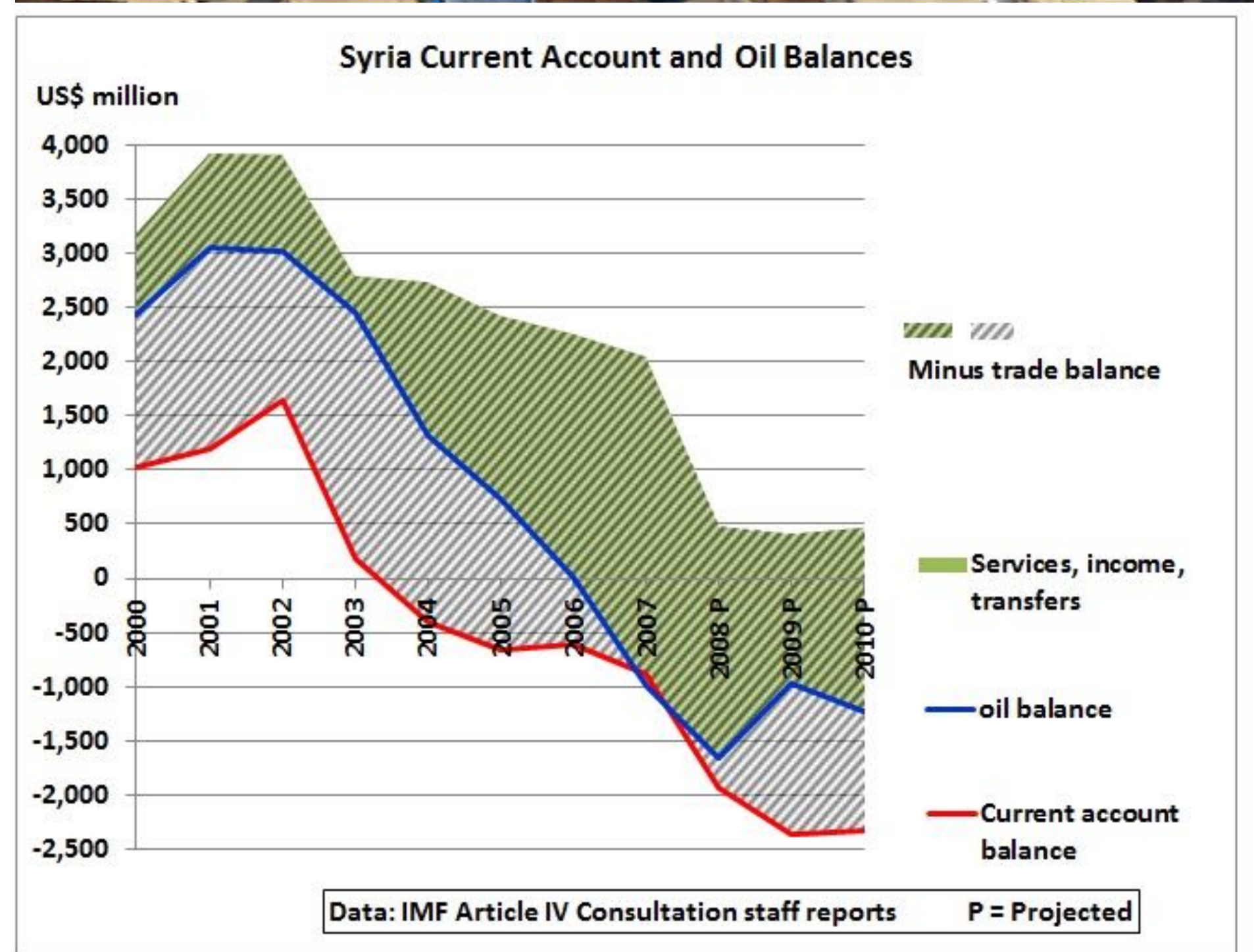
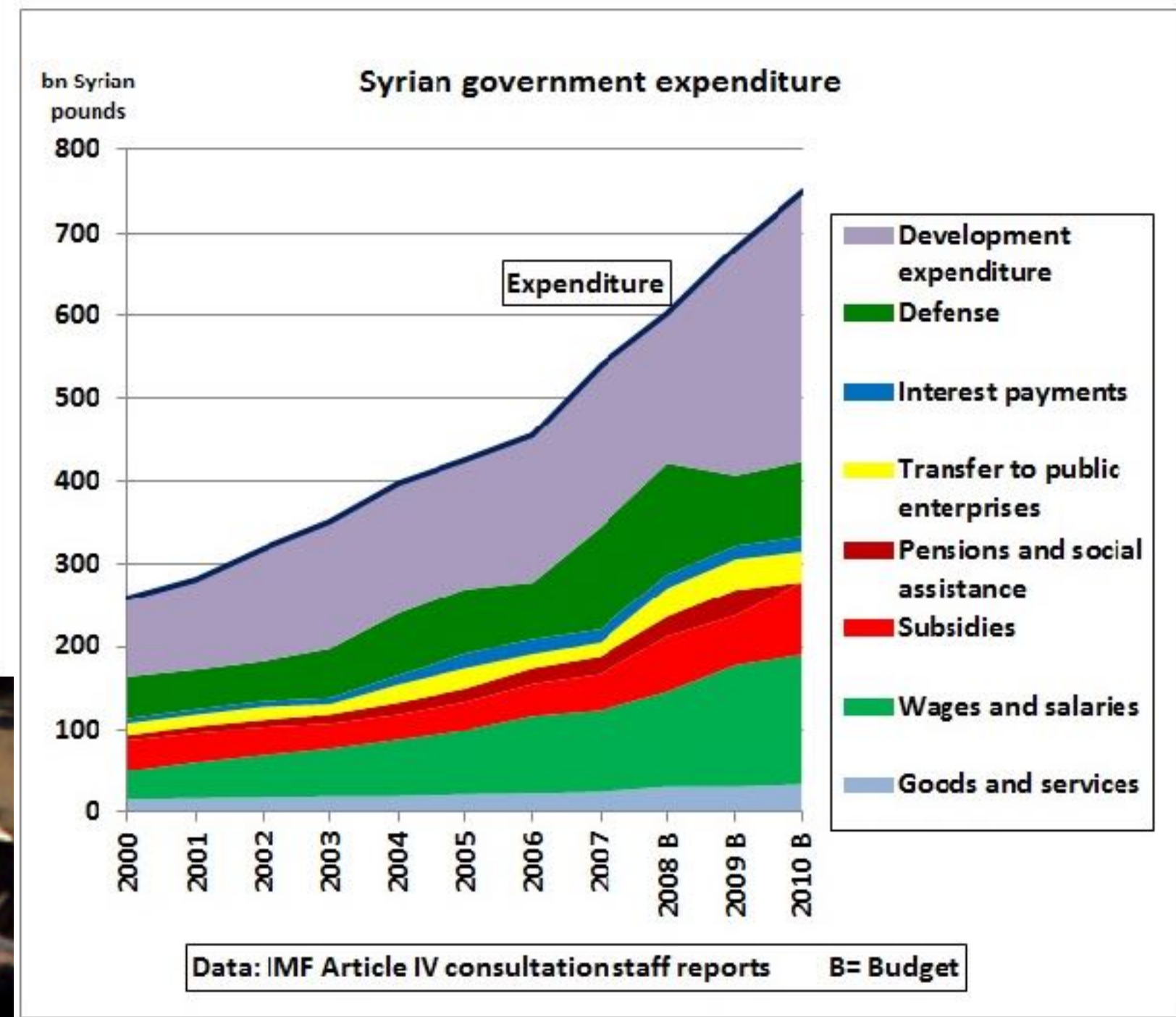
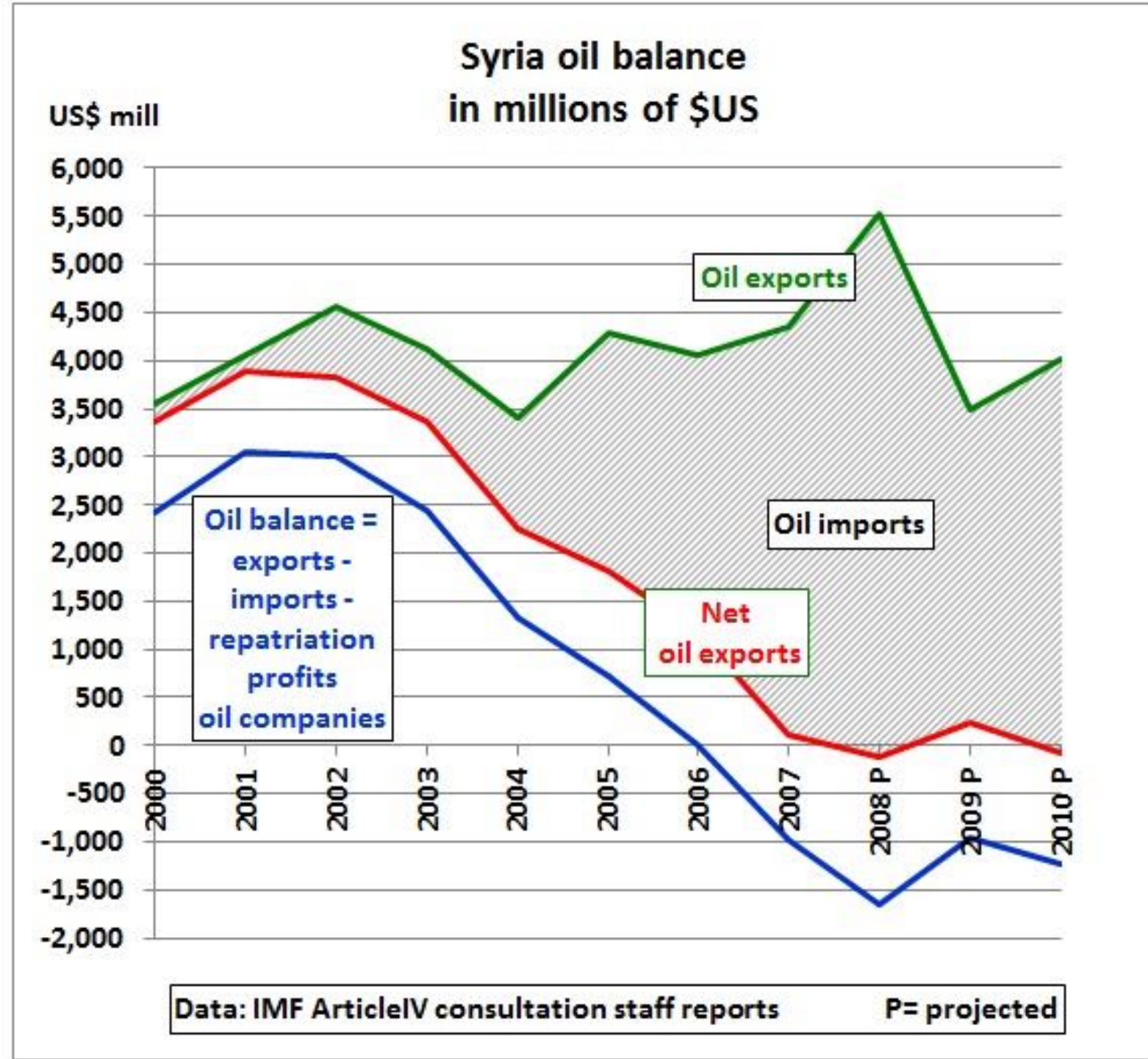
They had the good life, but now it's gone



They had the good life, but now it's gone

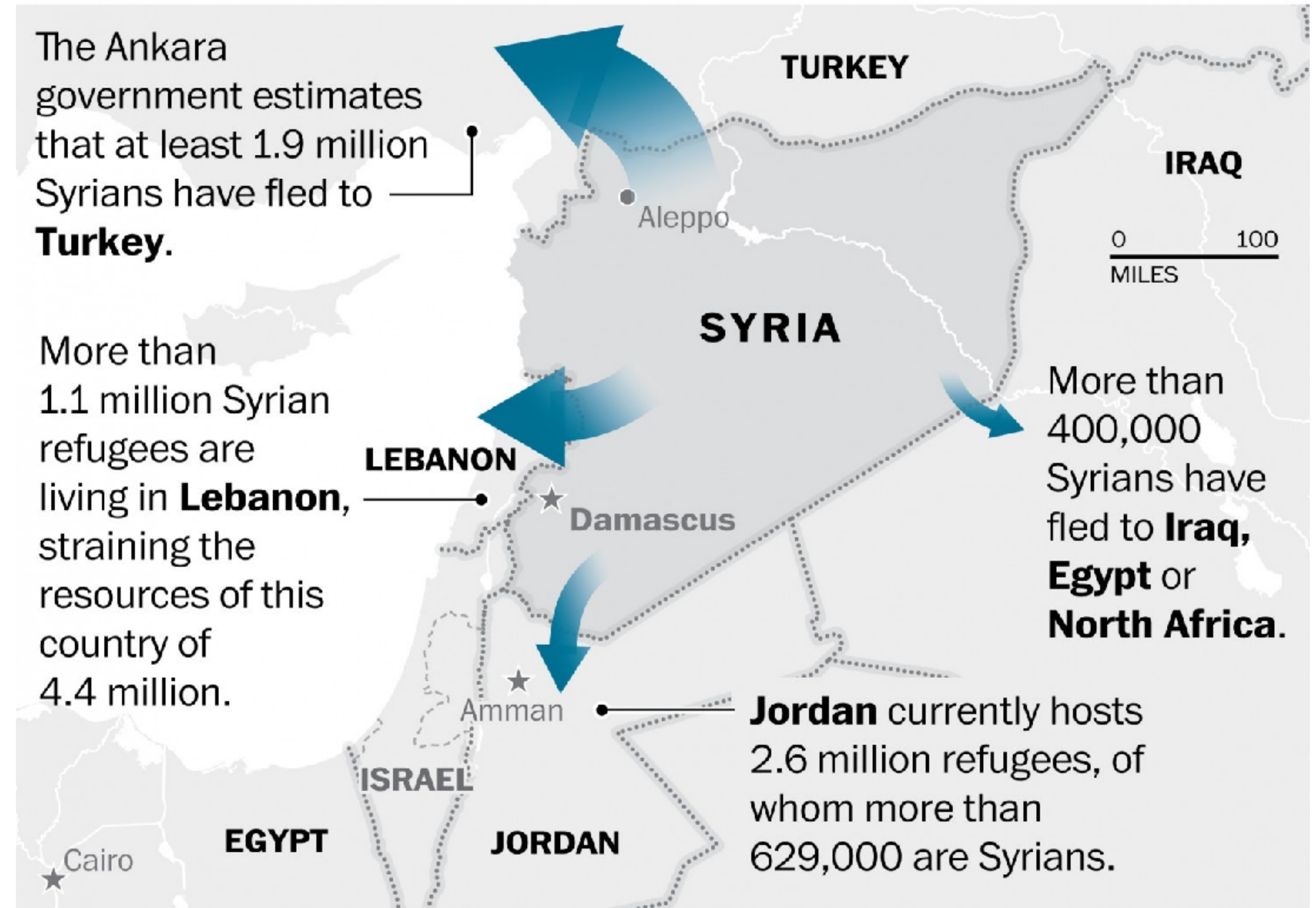
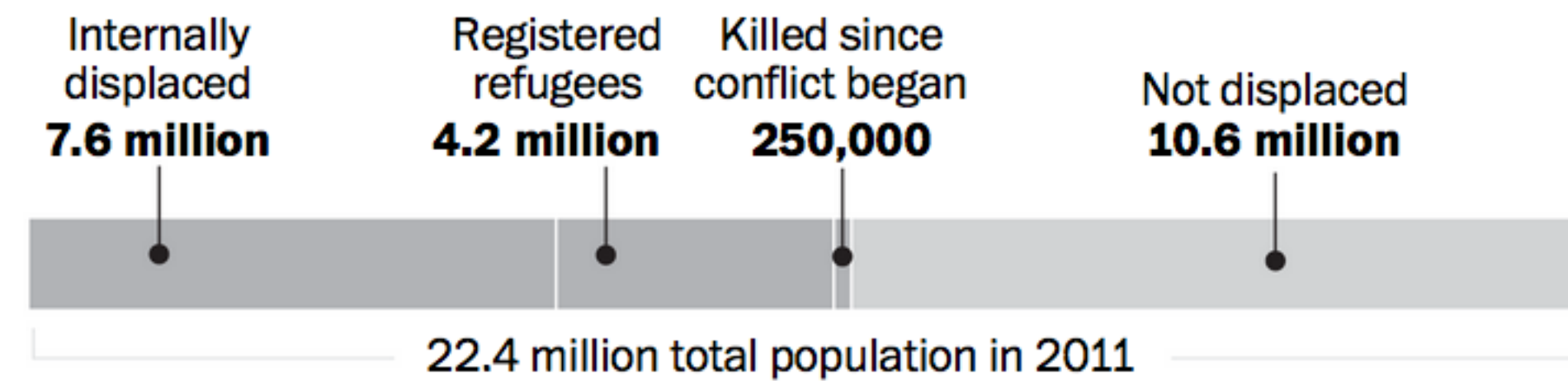


They had the good life, but now it's gone



The Syrian conflict escalated when oil crashed

At least 4 million Syrians have fled their homeland since 2011. Most have gone to neighboring countries.



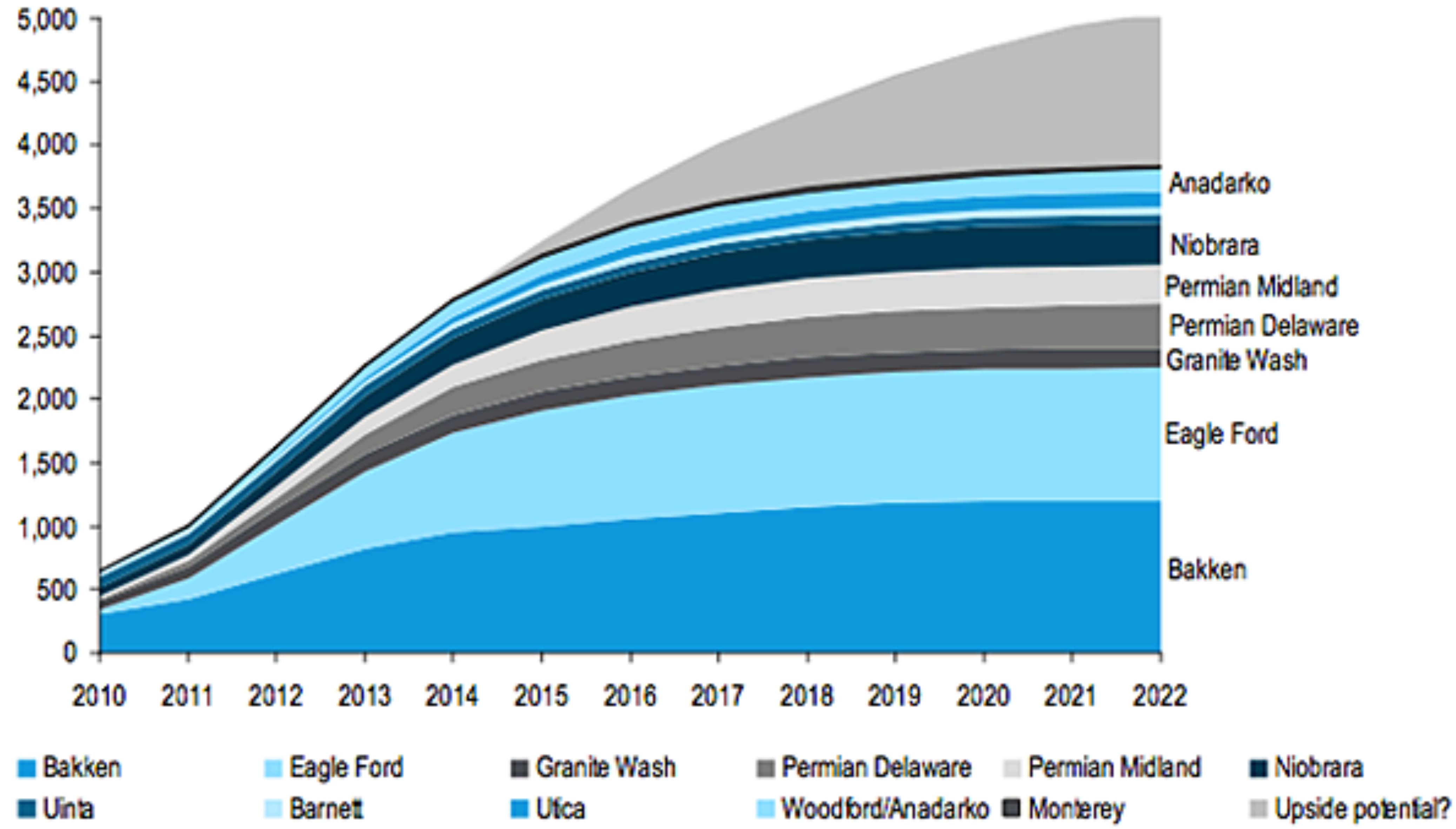
That's over there...

We're over here

We've been celebrating... but it's a retirement party

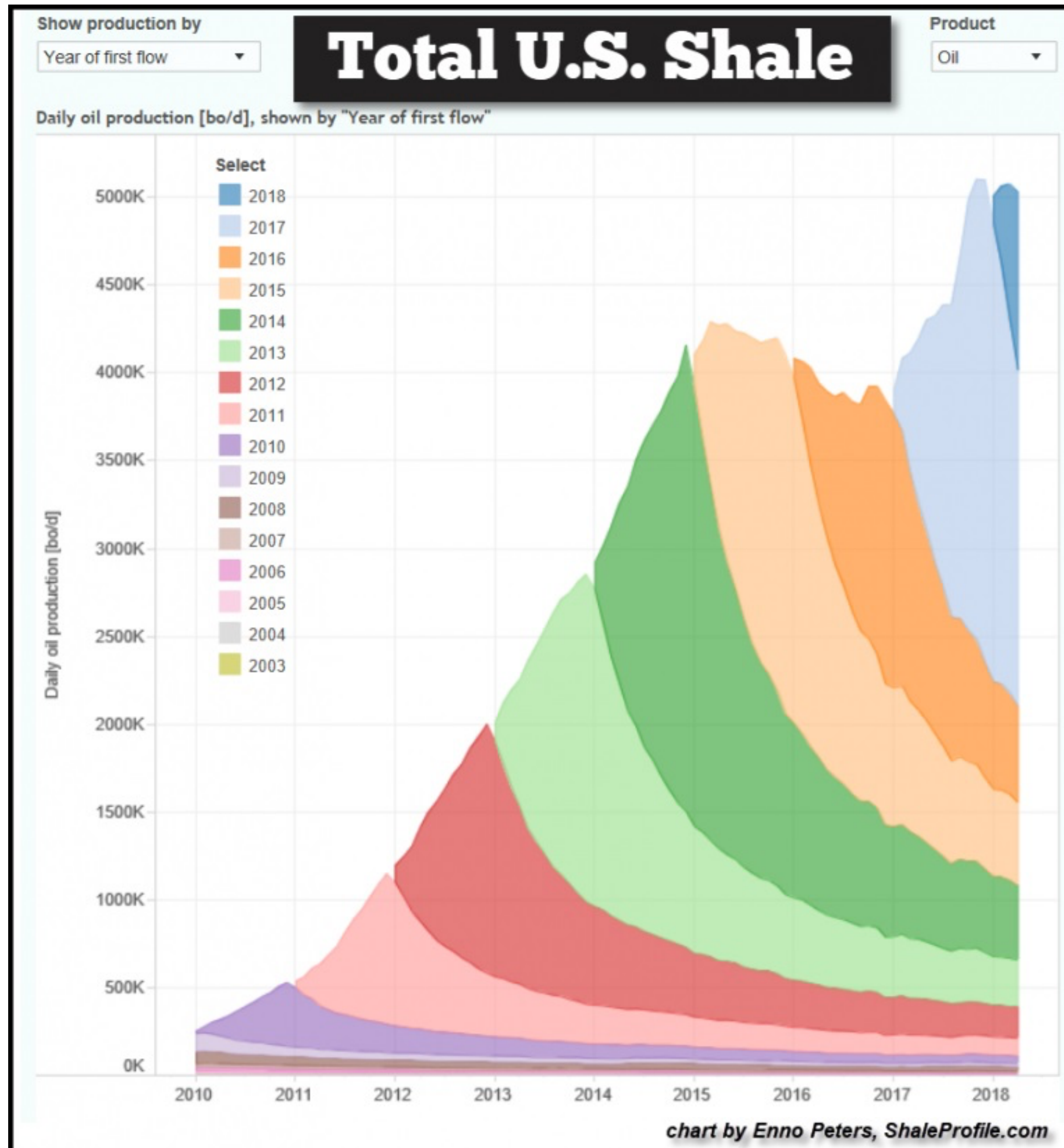


The oil patch ain't what it's ~~cracked~~ fracked up to be



Source: Citi Investment Research and Analysis

The oil patch ain't what it's ~~cracked~~ fracked up to be



It actually looks like this

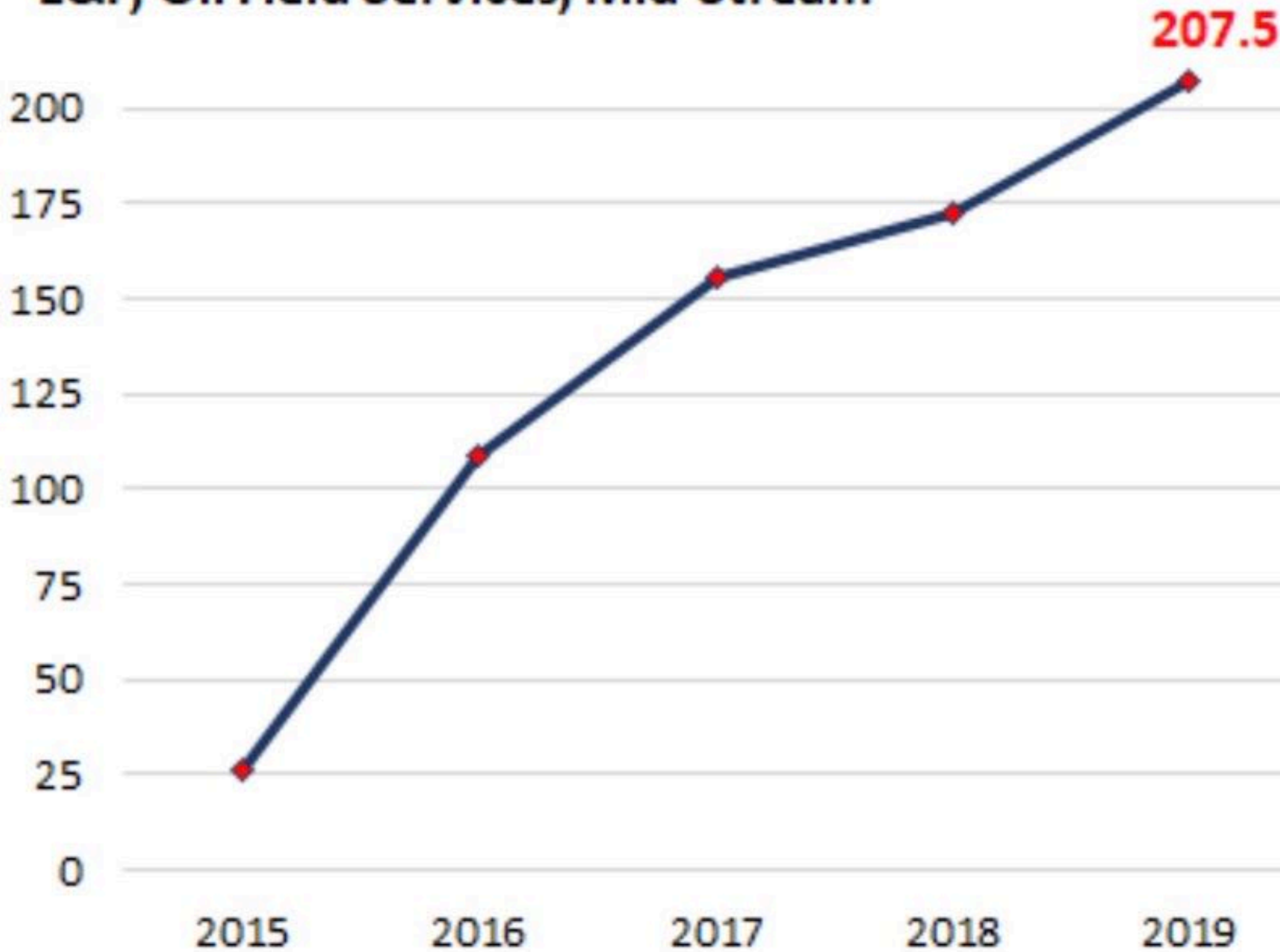
The oil patch is deep in debt



The Great American Fracking Bust

Cumulative Bankruptcy Debt, Billion \$

E&P, Oil Field Services, Mid-Stream



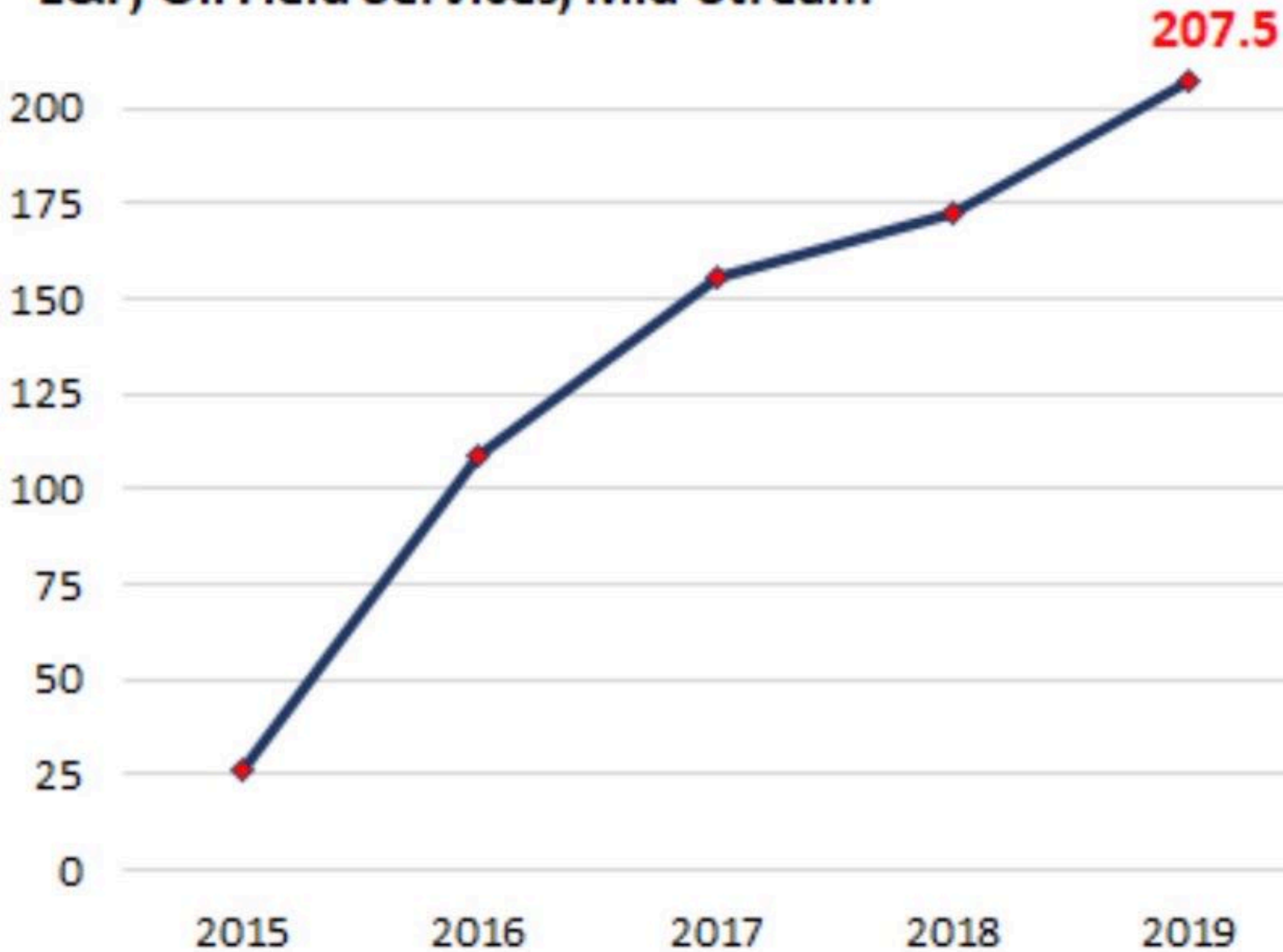
Year	Cash (Billions)	Debt (Billions)	Net Debt (Billions)
2006	32.8	6.7	-26.1
2007	34.5	7.2	-27.3
2008	31.4	9.4	-22.0
2009	10.7	9.6	-1.1
2010	8.5	15.0	6.5
2011	13.1	17.0	3.9
2012	9.9	11.5	1.6
2013	4.9	22.8	17.9
2014	4.8	29.1	24.3
2015	3.7	38.7	35.0
2016	3.7	42.8	39.1
2017	3.2	42.3	39.1
2018	2.9	37.8	34.9
2019	3.1	46.9	43.8

The oil patch is deep in debt

The Great American Fracking Bust

Cumulative Bankruptcy Debt, Billion \$

E&P, Oil Field Services, Mid-Stream

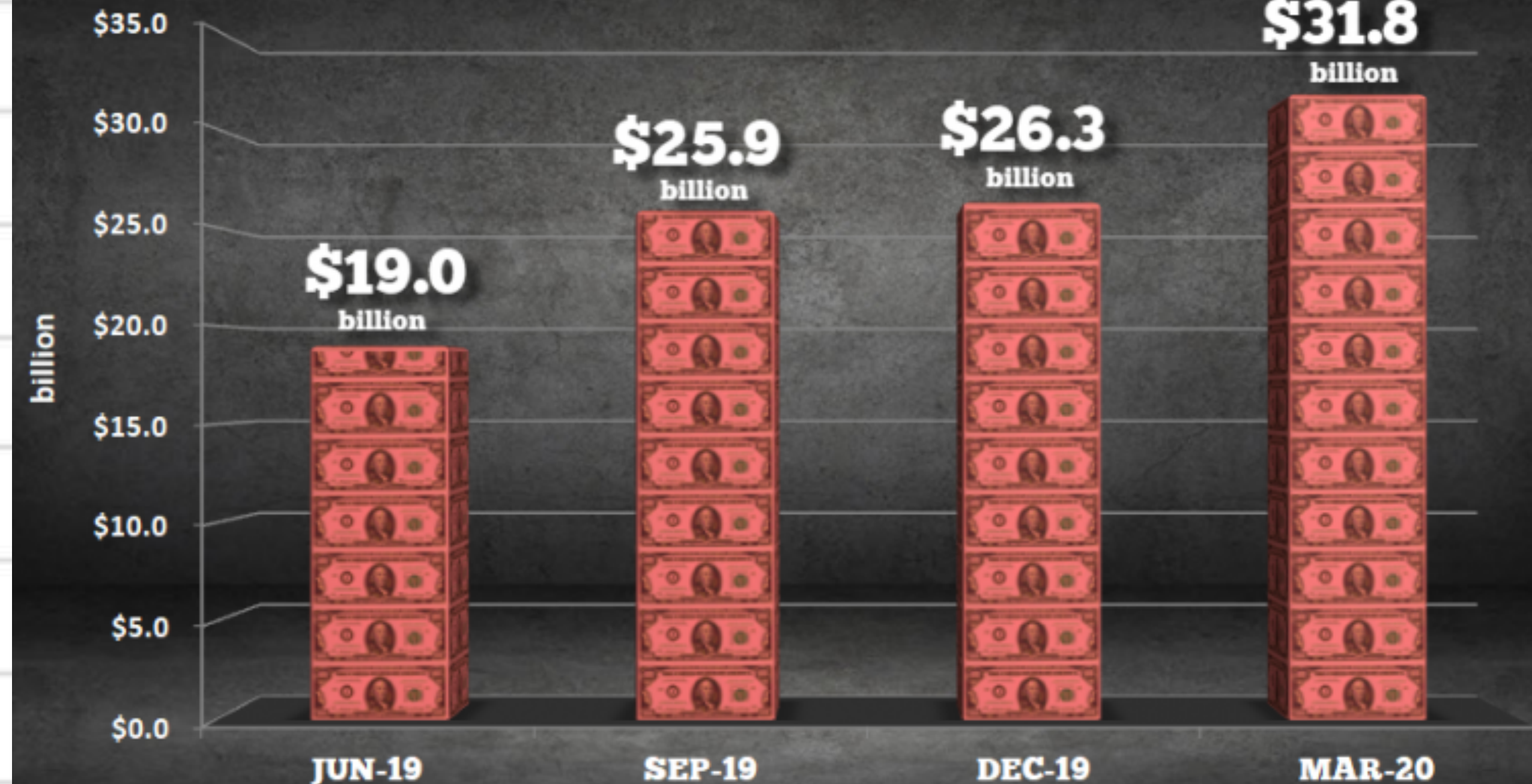


Source: Haynes and Boone

WOLFSTREET.com



ExxonMobil Long-Term Debt Quarterly Increase June 2019 to March 2020



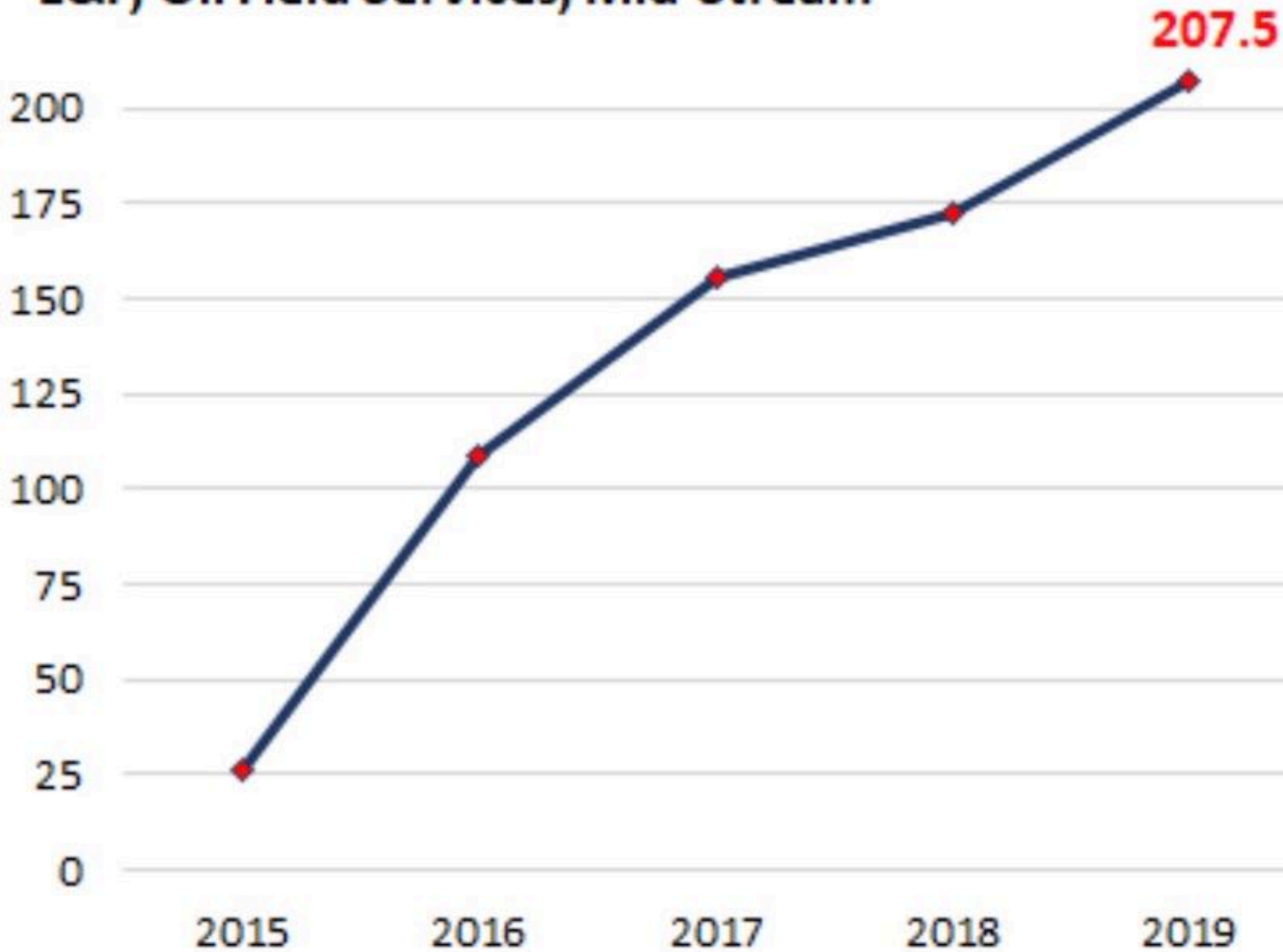
info from ExxonMobil's Quarterly Reports

The oil patch is deep in debt

The Great American Fracking Bust

Cumulative Bankruptcy Debt, Billion \$

E&P, Oil Field Services, Mid-Stream



Source: Haynes and Boone

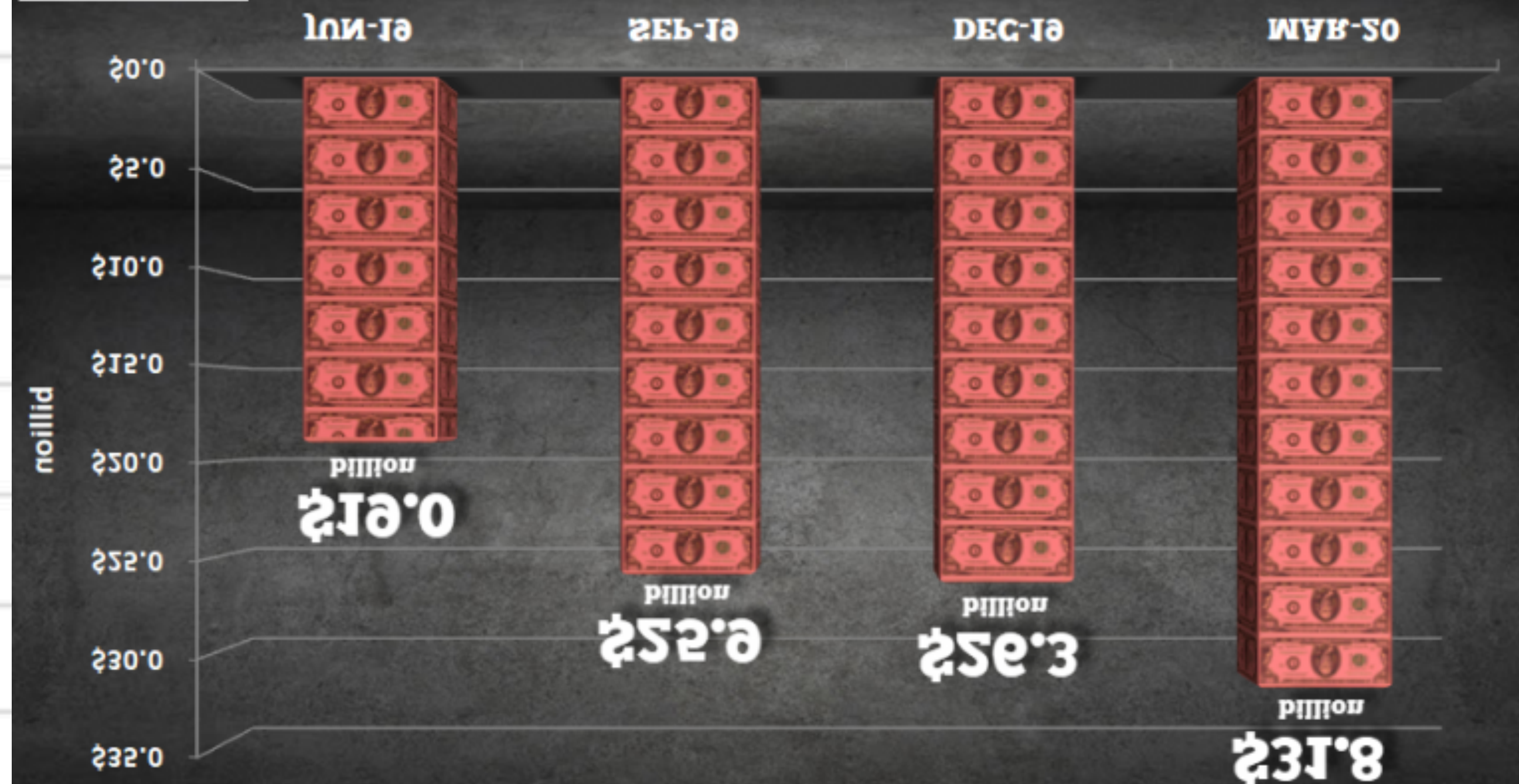
WOLFSTREET.com



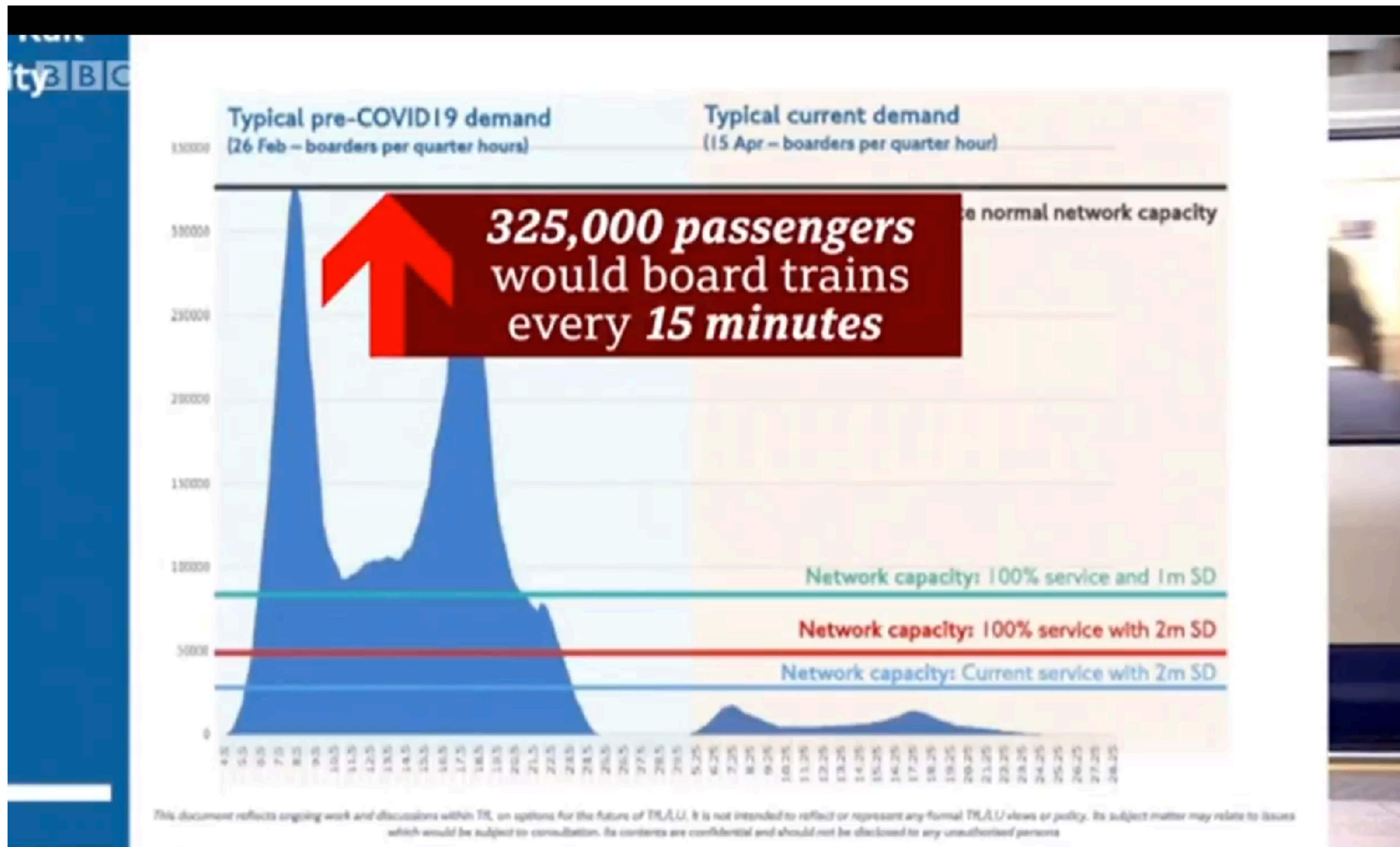
ExxonMobil Long-Term Debt Quarterly Increase June 2019 to March 2020



Info from ExxonMobil's Quarterly Report

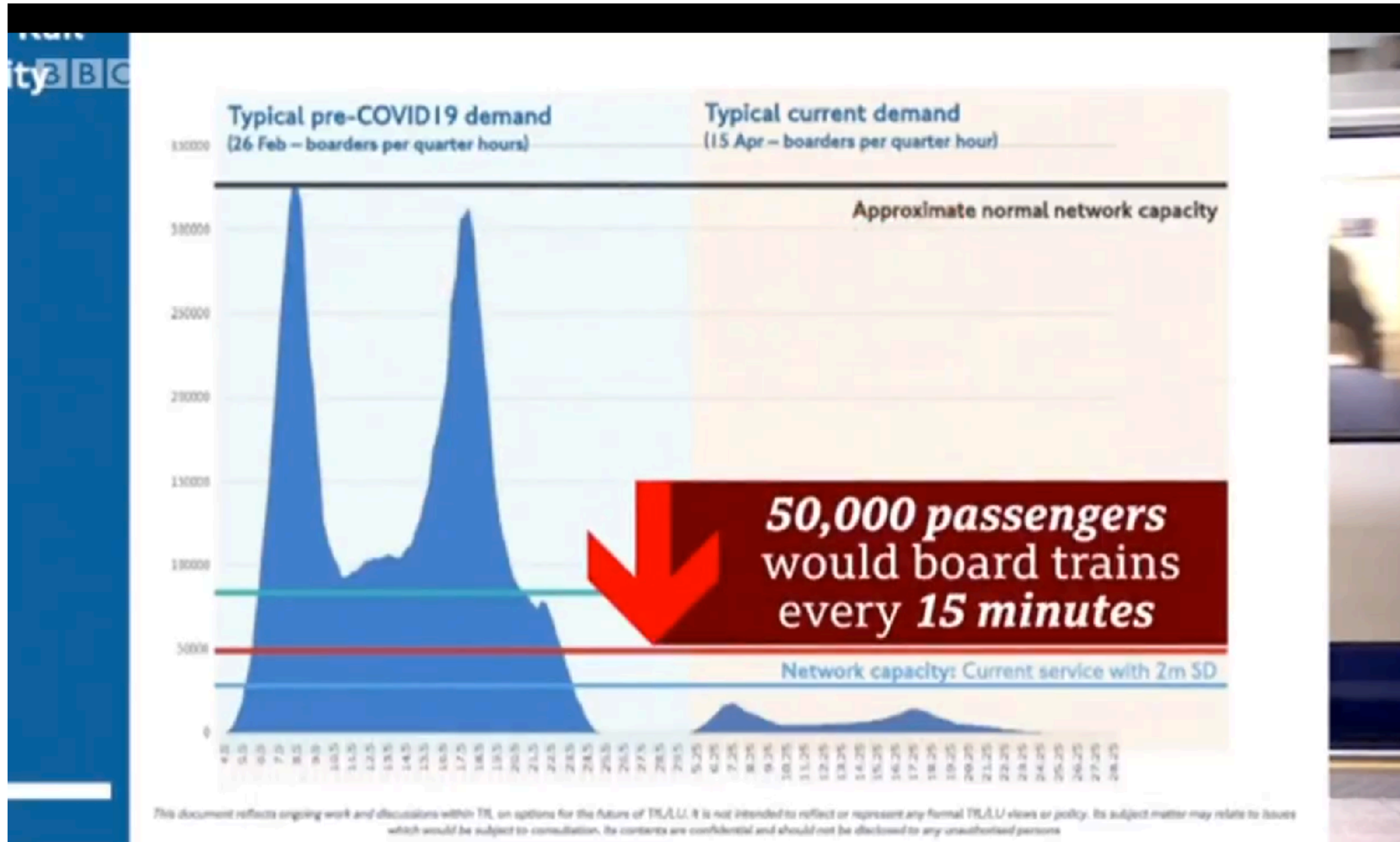


We have a new threat...social distancing decimates transit

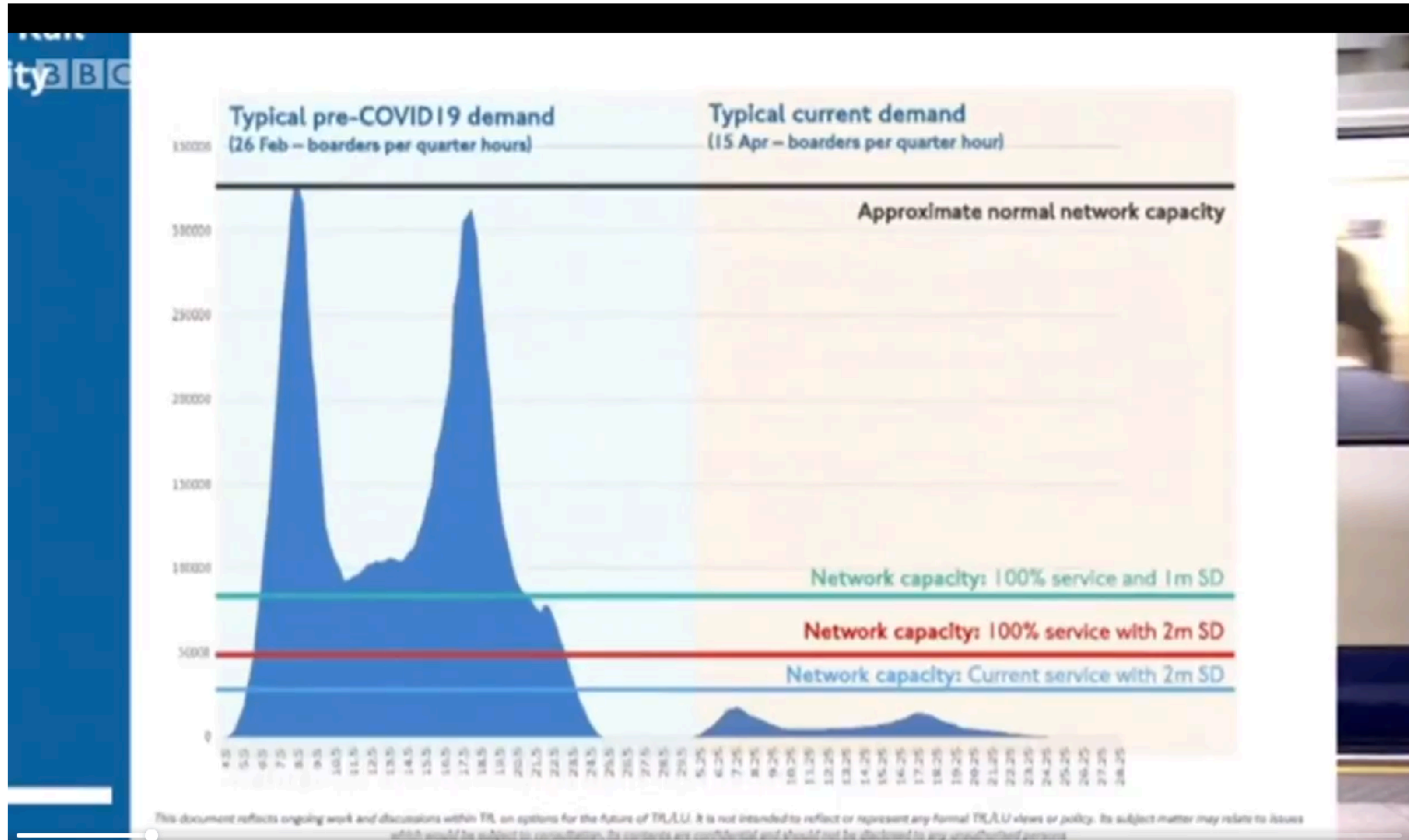


This document reflects ongoing work and discussions within TR, an options for the future of TR/LU. It is not intended to reflect or represent any formal TR/LU views or policy. Its subject matter may relate to issues which would be subject to consultation. Its contents are confidential and should not be disclosed to any unauthorised persons

We have a new threat...social distancing decimates transit



We have a new threat...social distancing decimates transit



We have a new threat...social distancing decimates transit

Commentary

The monthly magazine of opinion.

MAY 13, 2020 SCIENCE

What Spread Coronavirus in New York City? The Subways.

by Jeffrey Harris

ONE HUNDRED EIGHTY-FOUR THOUSAND CASES AND COUNTING. New York City now has one out of every eight confirmed cases of coronavirus infection in the United States.

Far more cases than Chicago, Detroit, Los Angeles, Miami, Boston, Philadelphia, New Orleans, Seattle and Houston combined. More cases



Just talking about it won't make much of an impact

8

Rebuilding Trust in Public Transportation



CALIFORNIA RESILIENT AND INNOVATIVE MOBILITY INITIATIVE

- PUBLIC TRANSIT DECLINE**
- Public transit likely slower to recover as travelers exercise social distancing & fear higher-occupancy modes
 - More likely if COVID-19 has multiple waves (e.g., resurgence in infections, new viral strands, etc.)

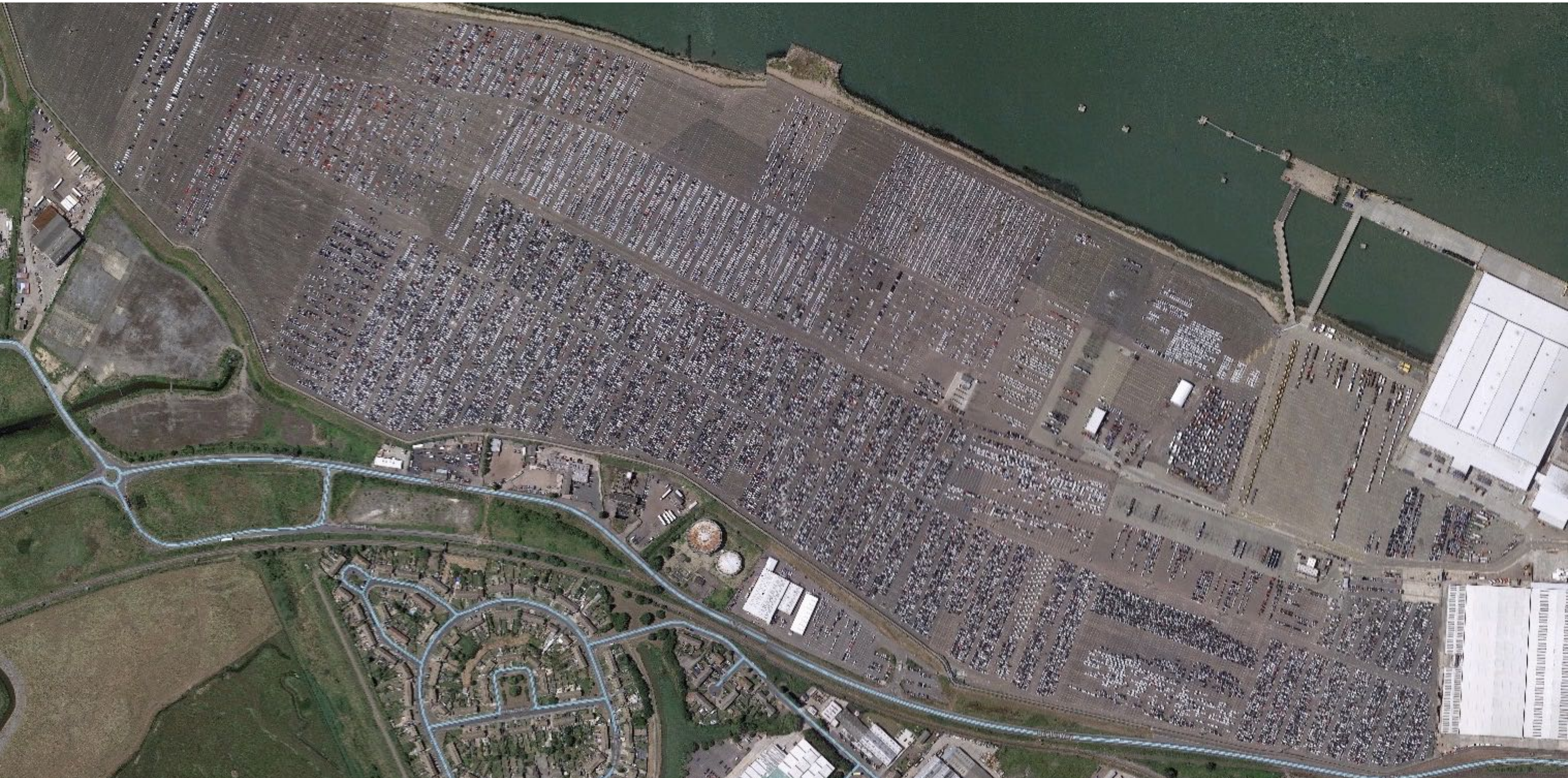
- + PUBLIC TRANSIT RENAISSANCE**
- Ridership increases due to economic hardship and restructured services
 - Innovations and bold policy measures (e.g., free transit, microtransit options)
 - Flexible financial model to reinforce this



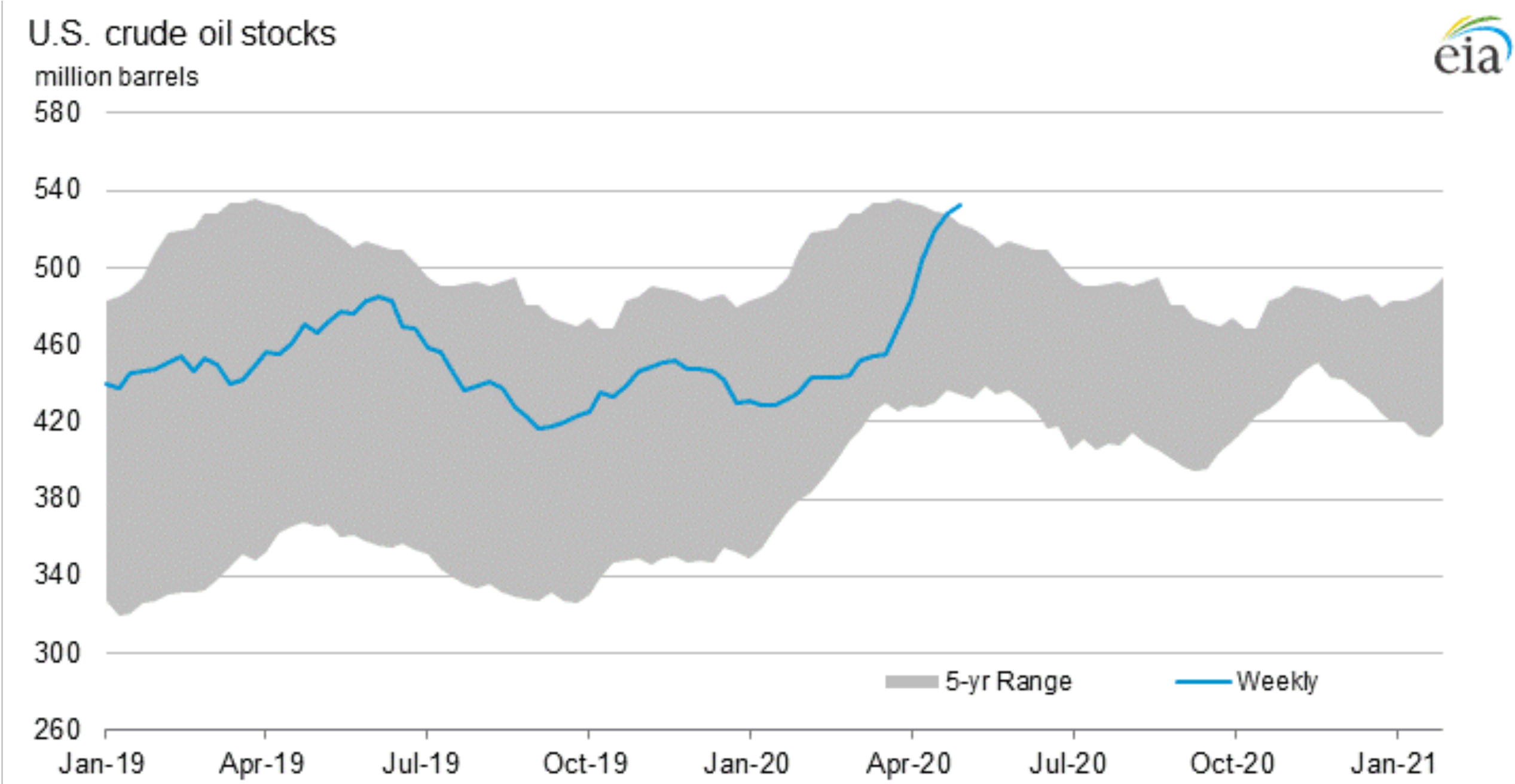
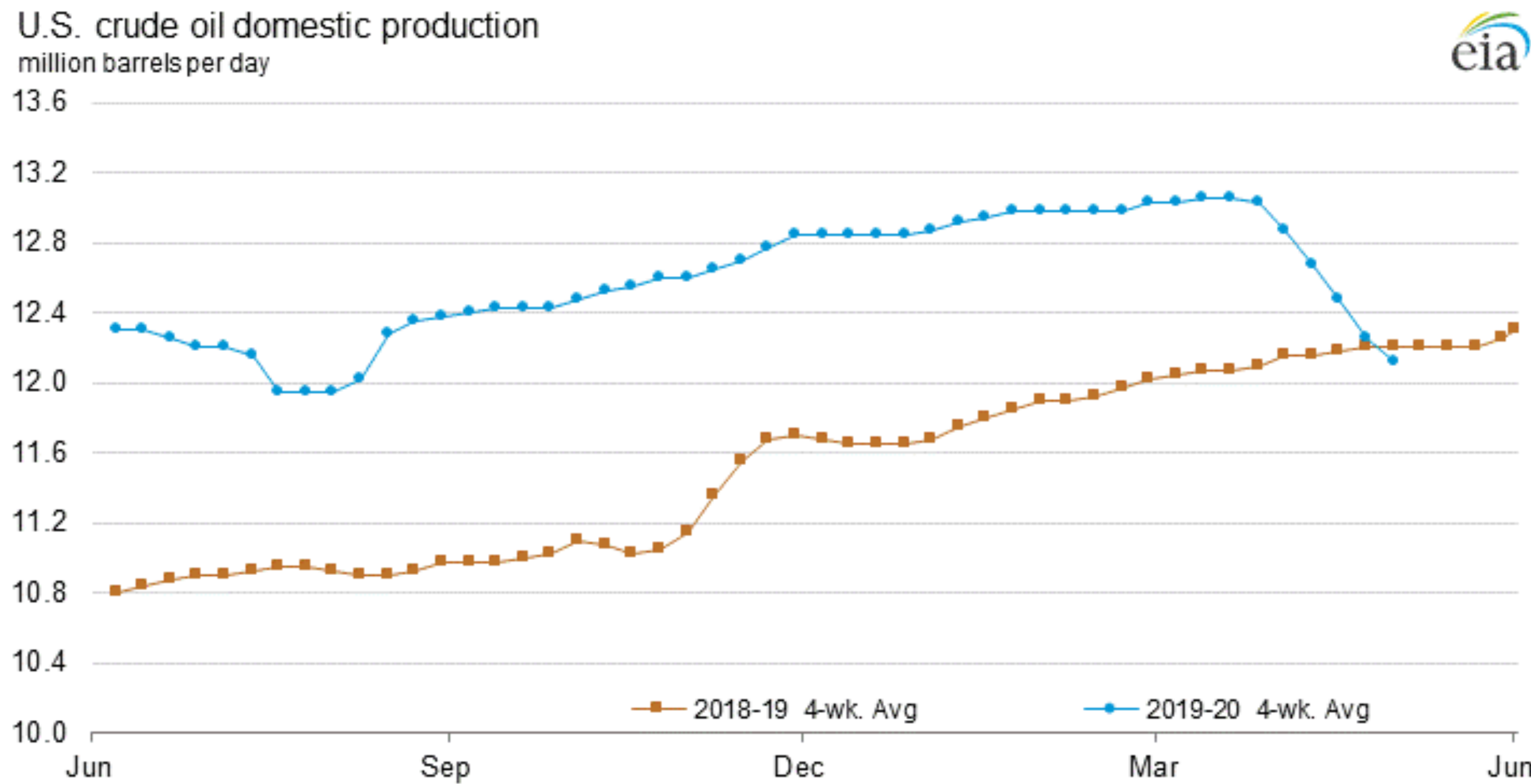
If we don't trust transit, will we make another billion cars?



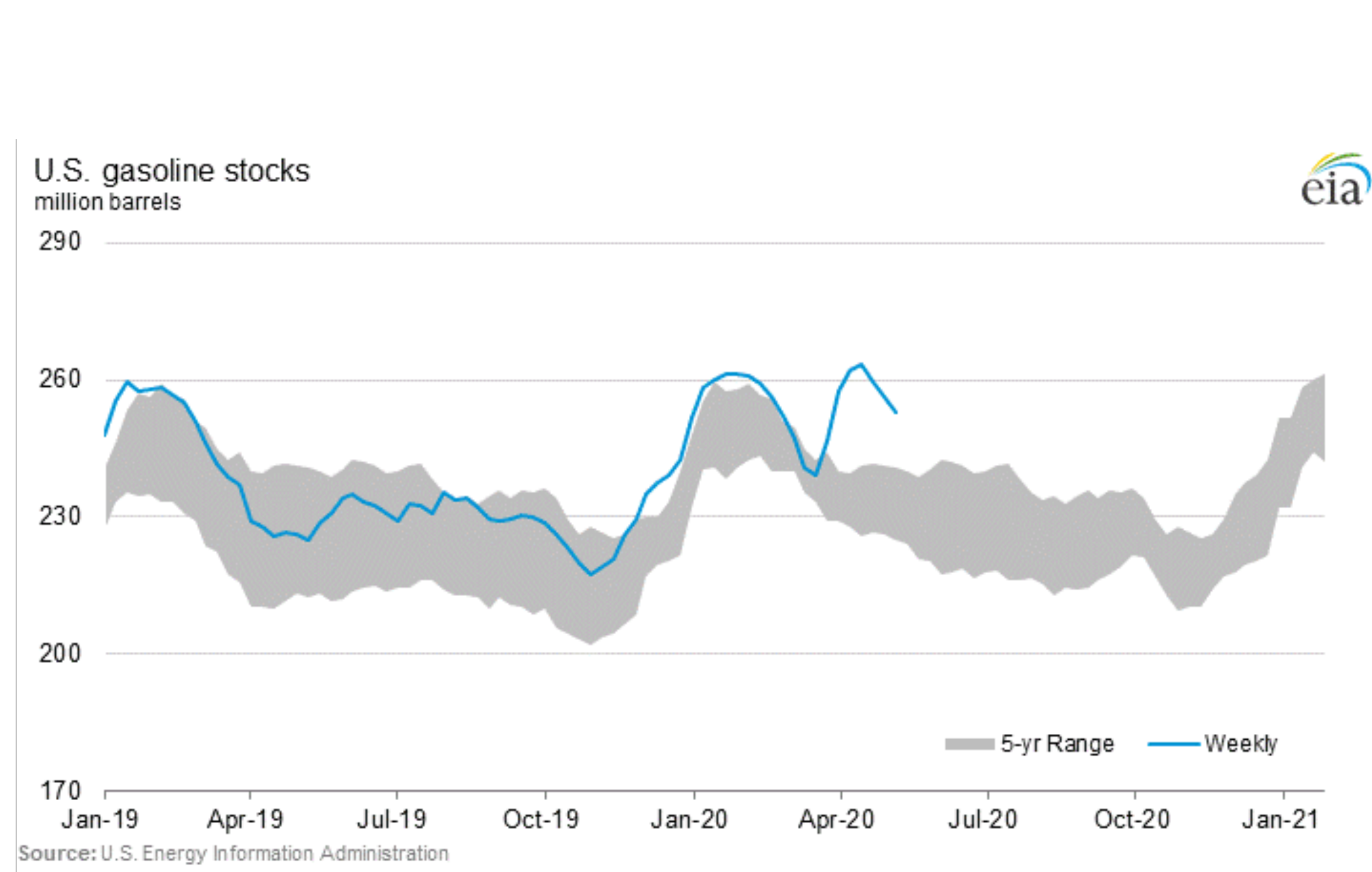
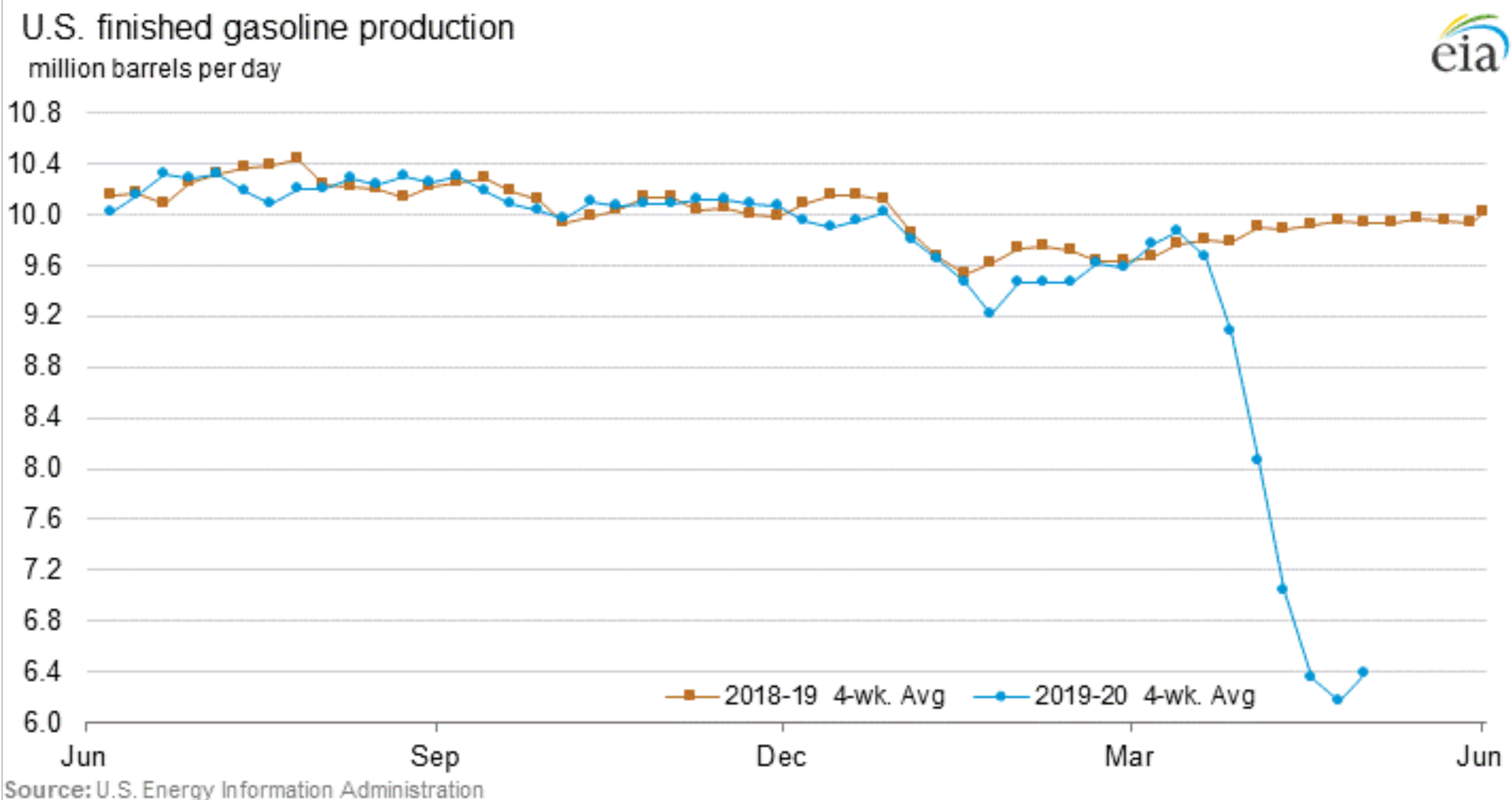
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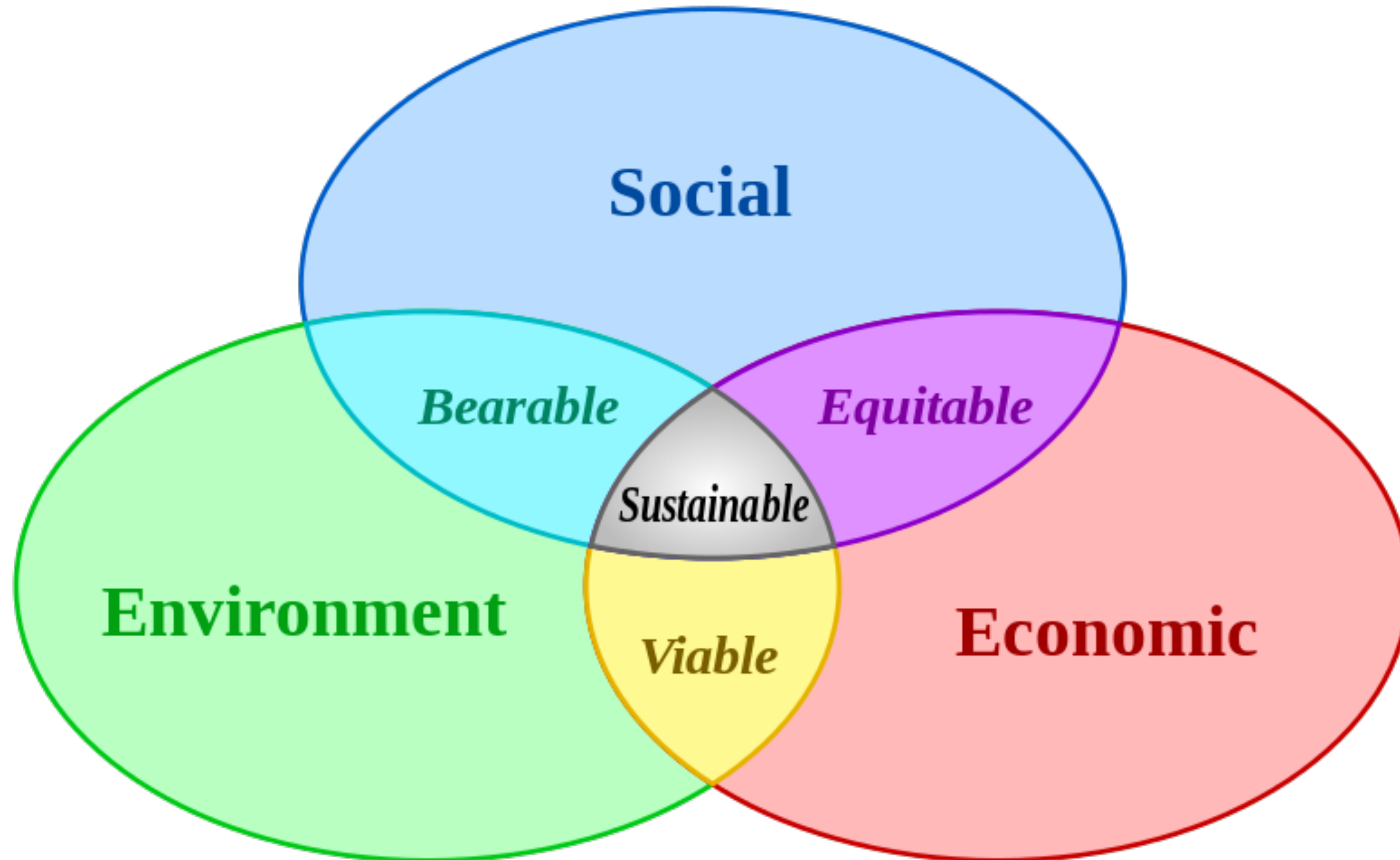
This week in Petroleum has oil production cutback



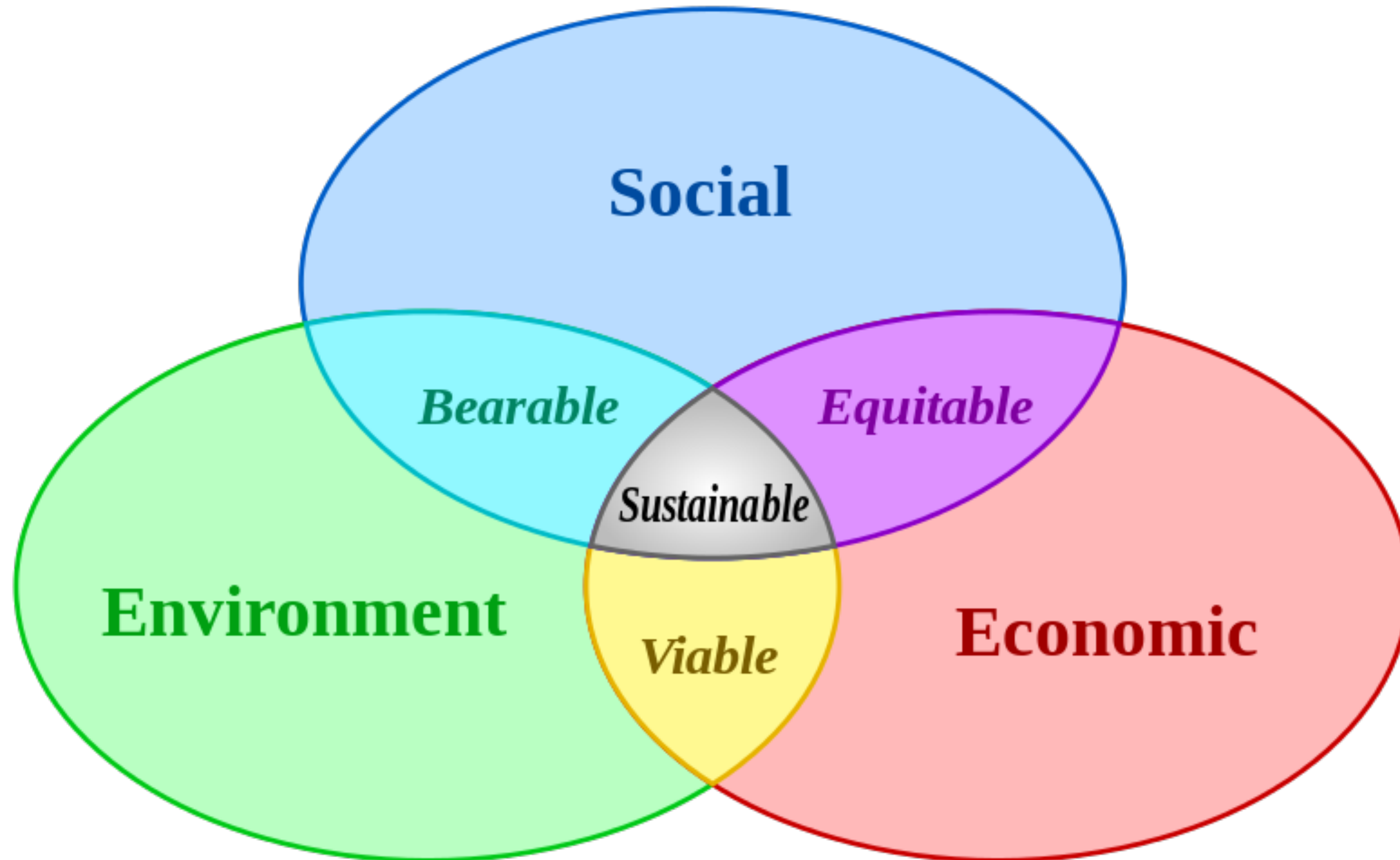
This week in Petroleum has gas refining & storage



With the economy in shambles, it's time to re-think policy

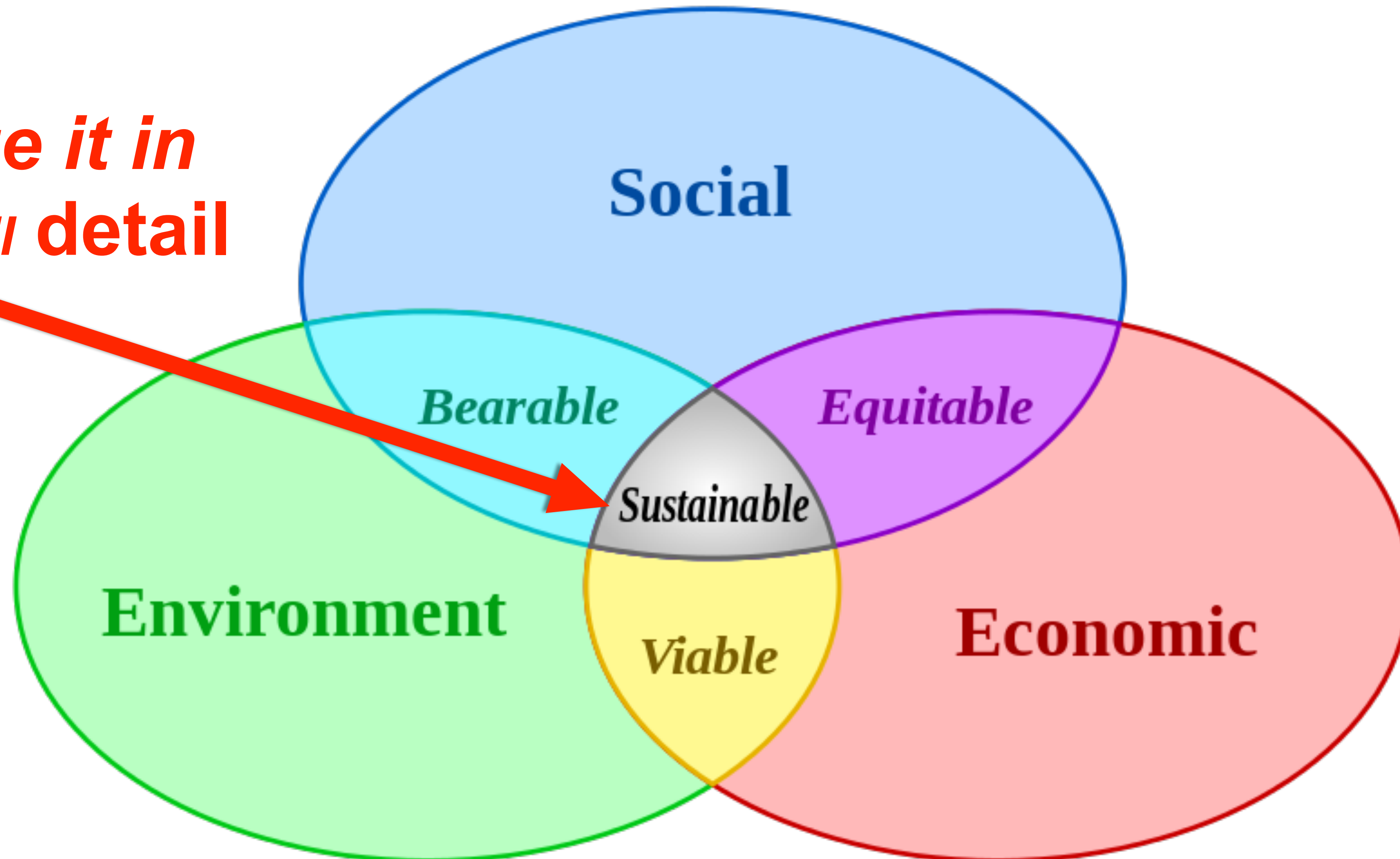


**We hear a lot about *sustainability* these days...
and it is often represented like this**

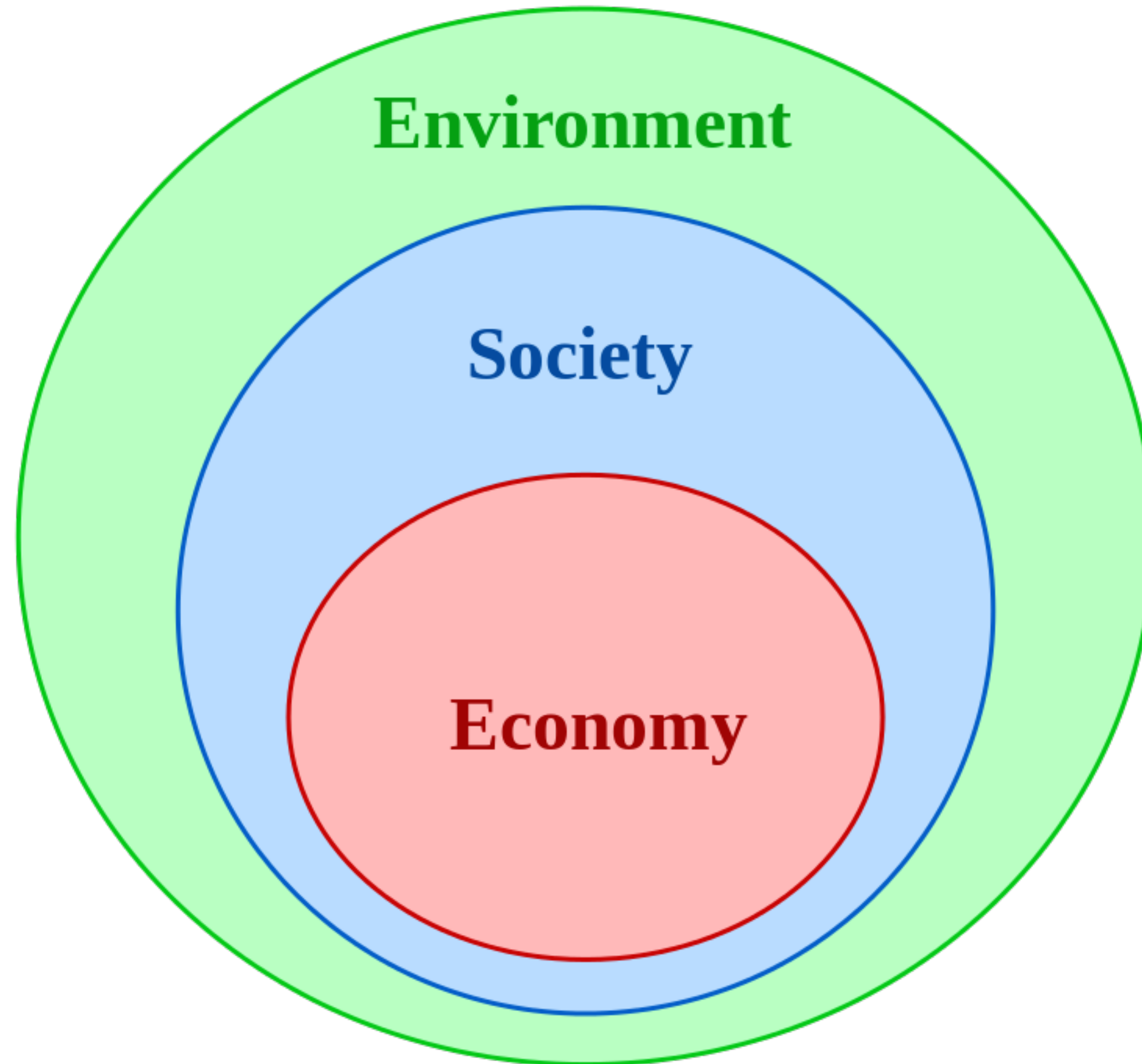


**We hear a lot about *sustainability* these days...
and it is often represented like this**

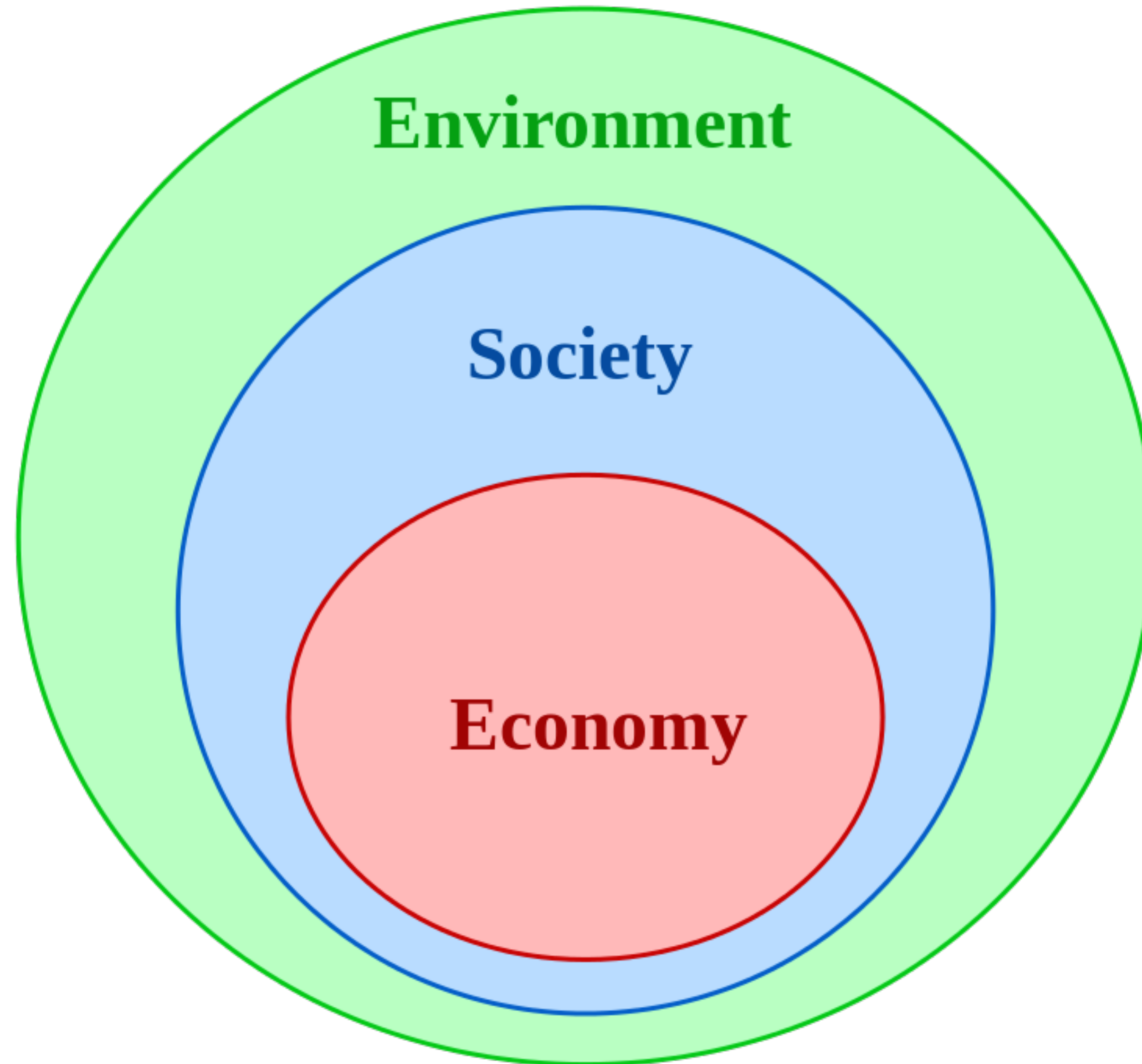
***squeeze it in
as a small detail***



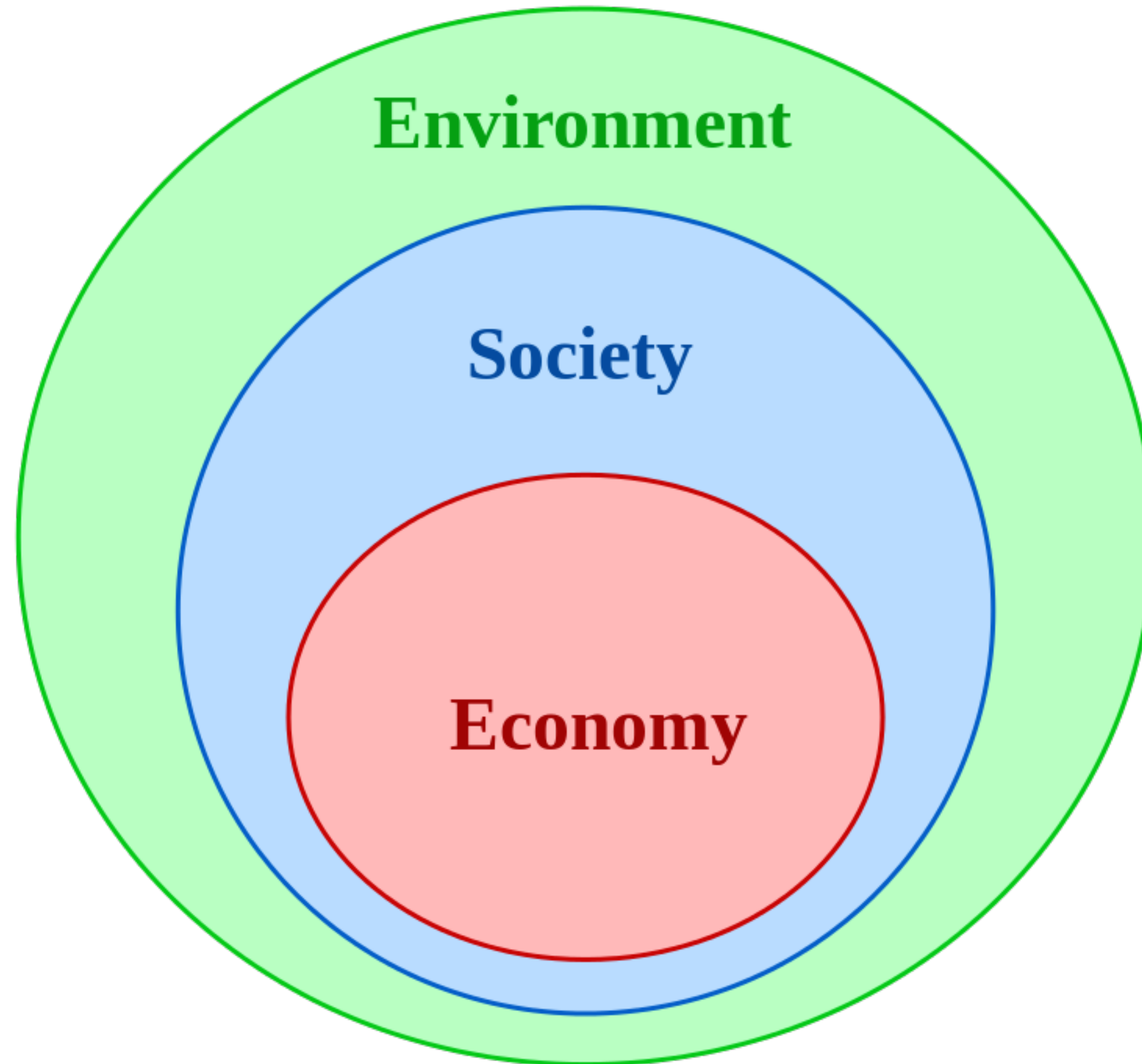
But the economy is a wholly owned subsidiary of the environment



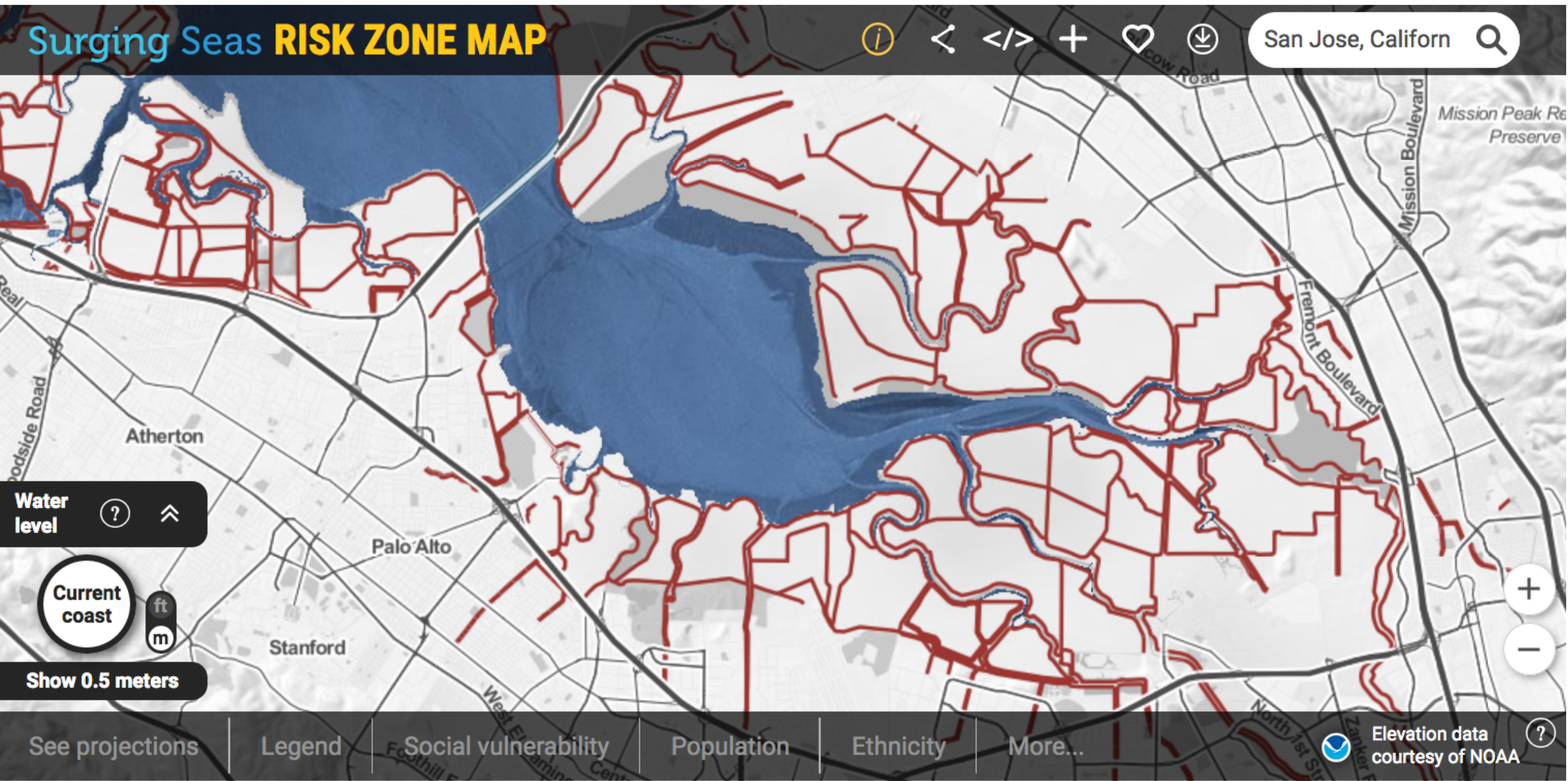
So an economy is *sustainable* only if it consumes energy slower than it can be renewed.



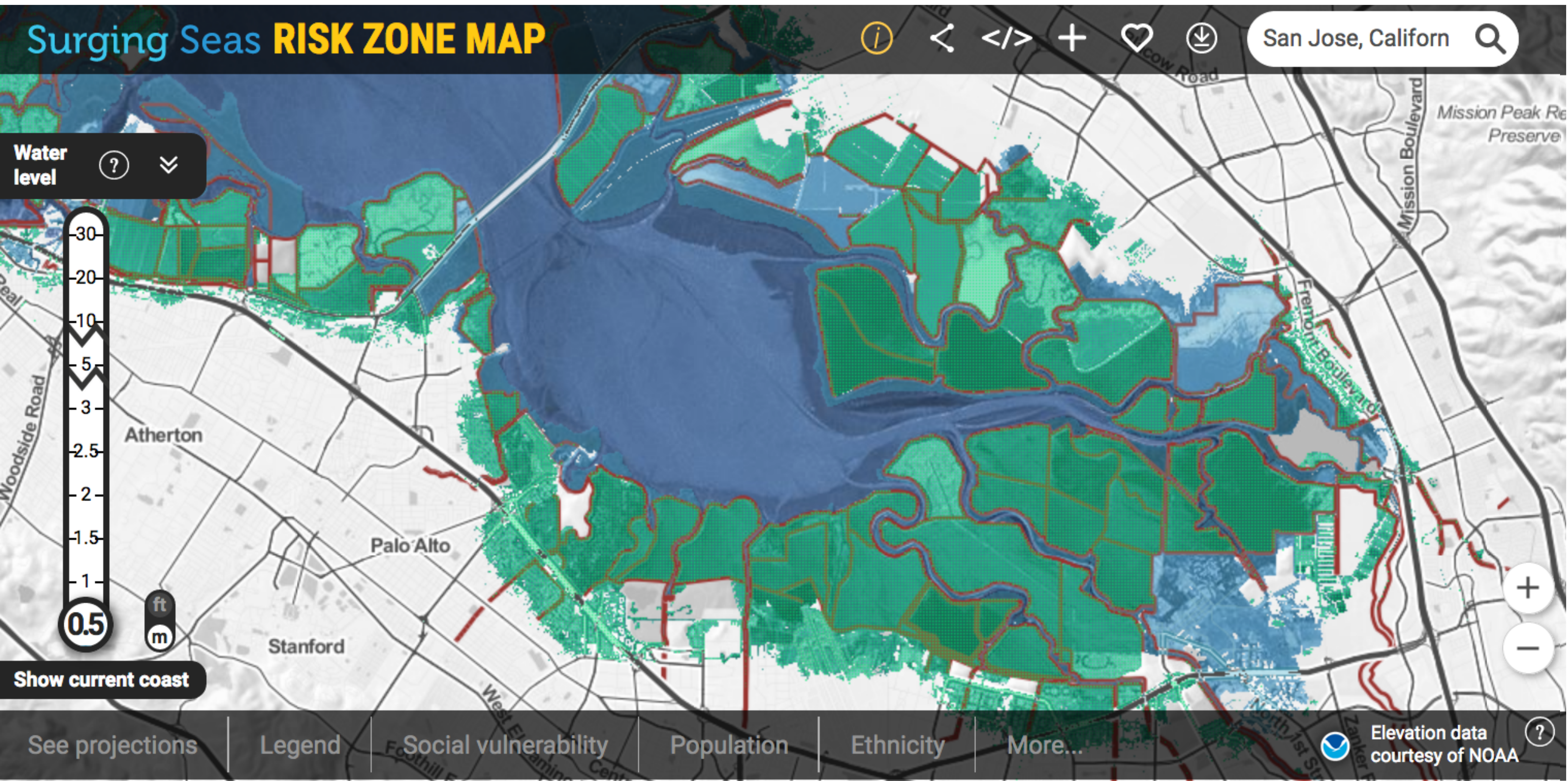
Sustainability is an overused word which simply means survival



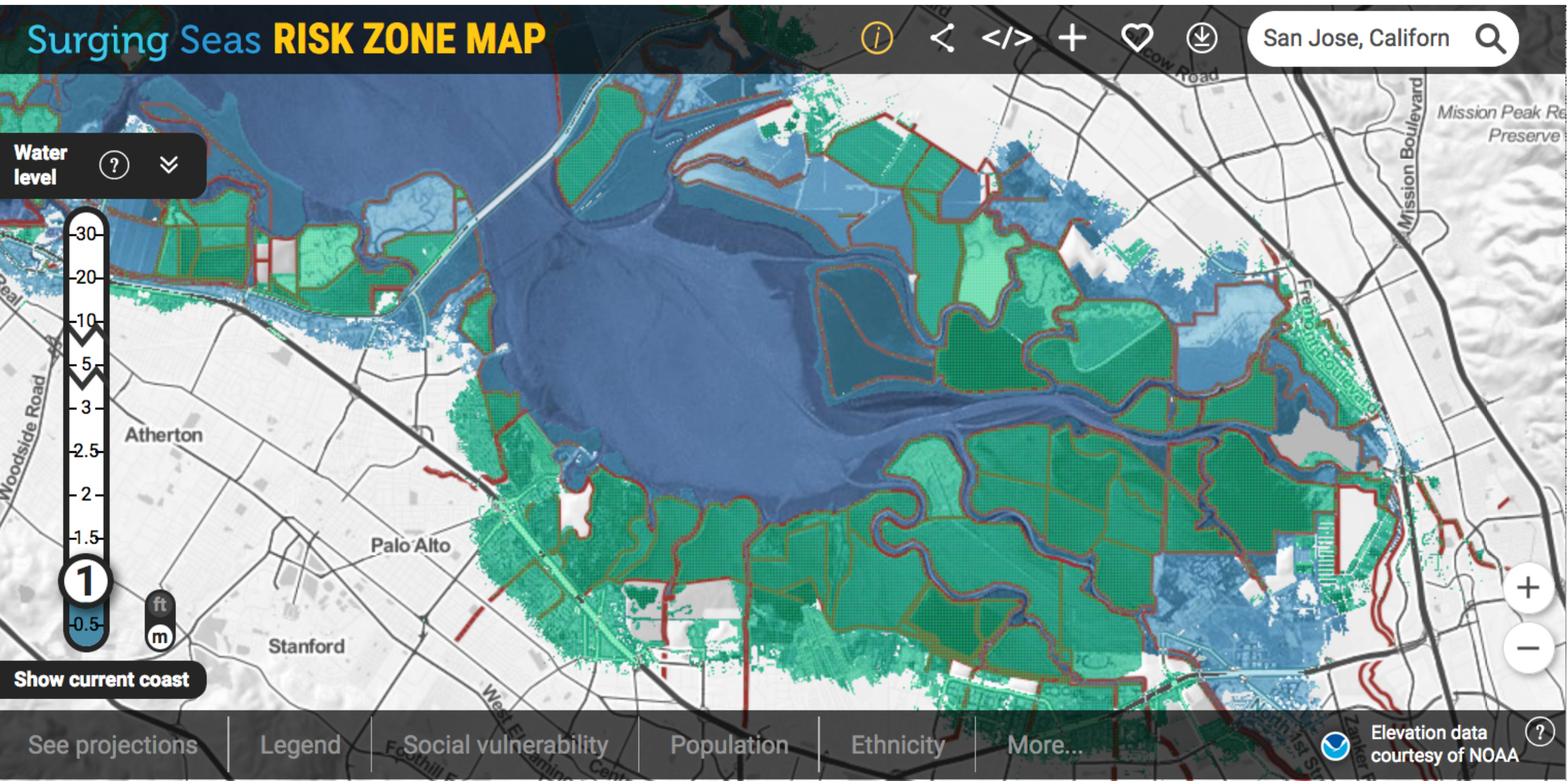
Climate change will change Silicon Valley



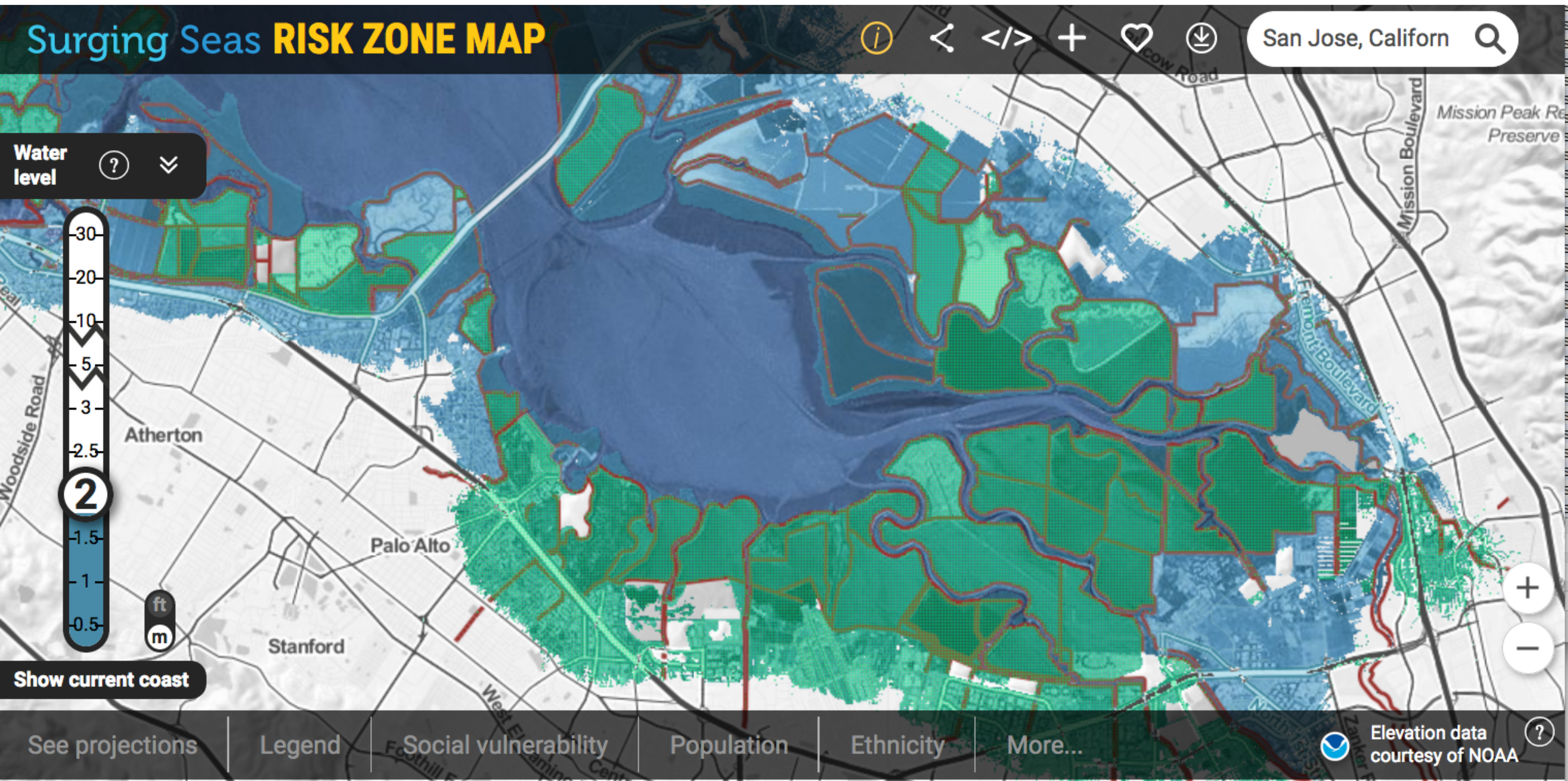
Climate change will change Silicon Valley



Climate change will change Silicon Valley



Climate change will change Silicon Valley



**If Silicon Valley were perfect, with *zero* emissions,
what good would it do?**

$$\frac{3,000,000}{7,400,000,000} = 0.04\%$$

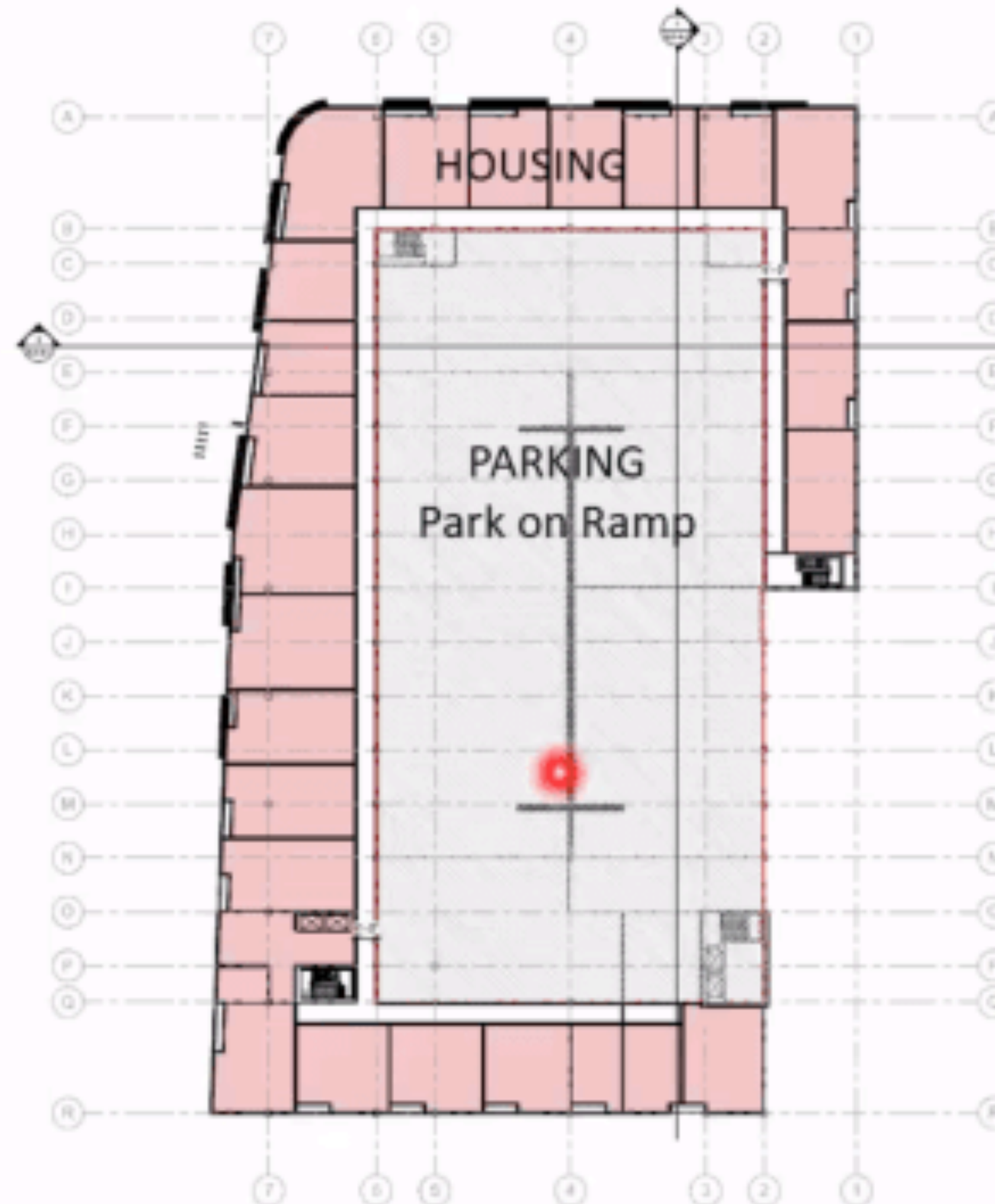
If Silicon Valley were perfect, with zero emissions, what good would it do?

$$\frac{3,000,000}{7,400,000,000} = 0.04\%$$

If we are serious about survival, our only option is to inspire and export zero emission solutions

We can't inspire if local policy focuses on more cars

OPTION C – LIBRARY with HOUSING and PARKING ABOVE



Ground Floor - Maximum of
~ 46,500 GSF

Notes:

- As Shown
- ~35,490 GSF Library and
- ~11,010 GSF Housing and Commercial

We can't inspire if local policy focuses on more cars

highway expansion is not healthy for children and other living things



COAST COUNTY OF SANTA CRUZ (APR 2011)

LEGEND:
- Bus Lanes
- Proposed Repaving Mill
- Right of Way

SECTION B-A EXISTING
SECTION B-B EXISTING
PROPOSED INSIDE WIDENING
PROPOSED OUTSIDE WIDENING
EXISTING CAPITOL AVENUE OVERCROSSING
PROPOSED CAPITOL AVENUE OVERCROSSING PROFILE

Highway 1 Auxiliary Lanes
(State Park Drive to Bay Avenue/Porter Street)

SCRTC | MEASURE D | Caltrans

We can do much more — “Right here in River City”



Swenson Solar

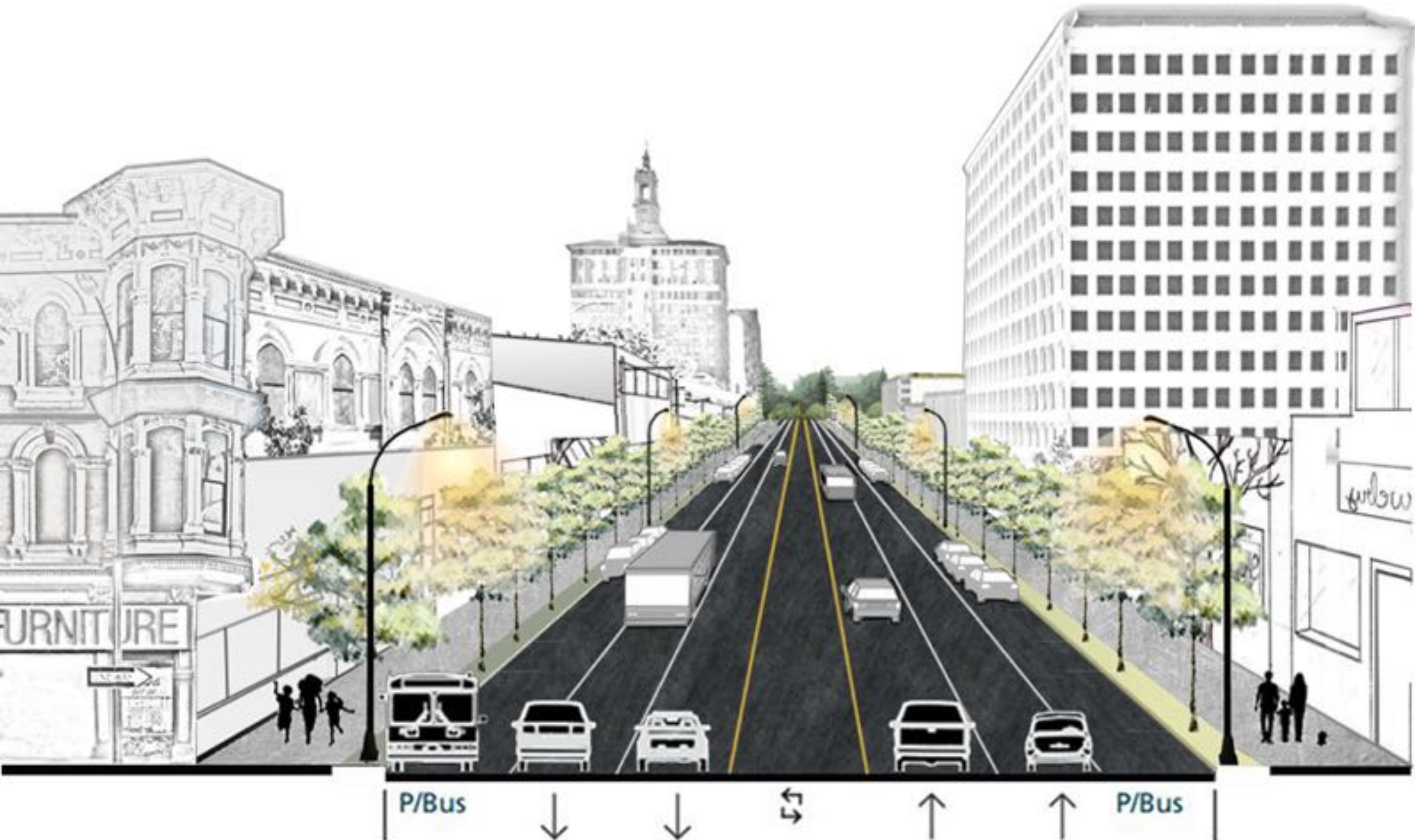
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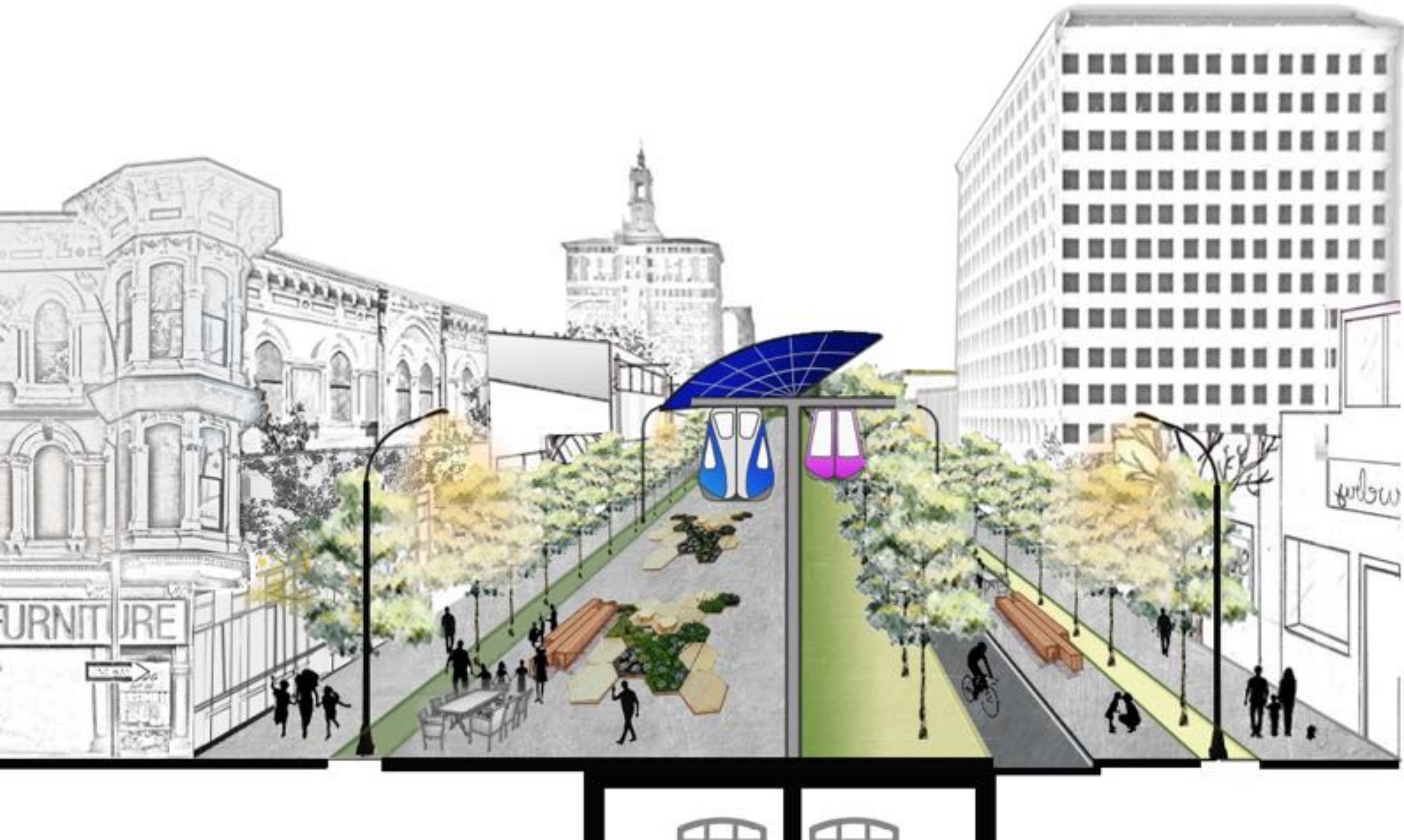
We can do much more — “Right here in River City”



We can do much more — and do it over the hill too



We can do much more — and do it over the hill too



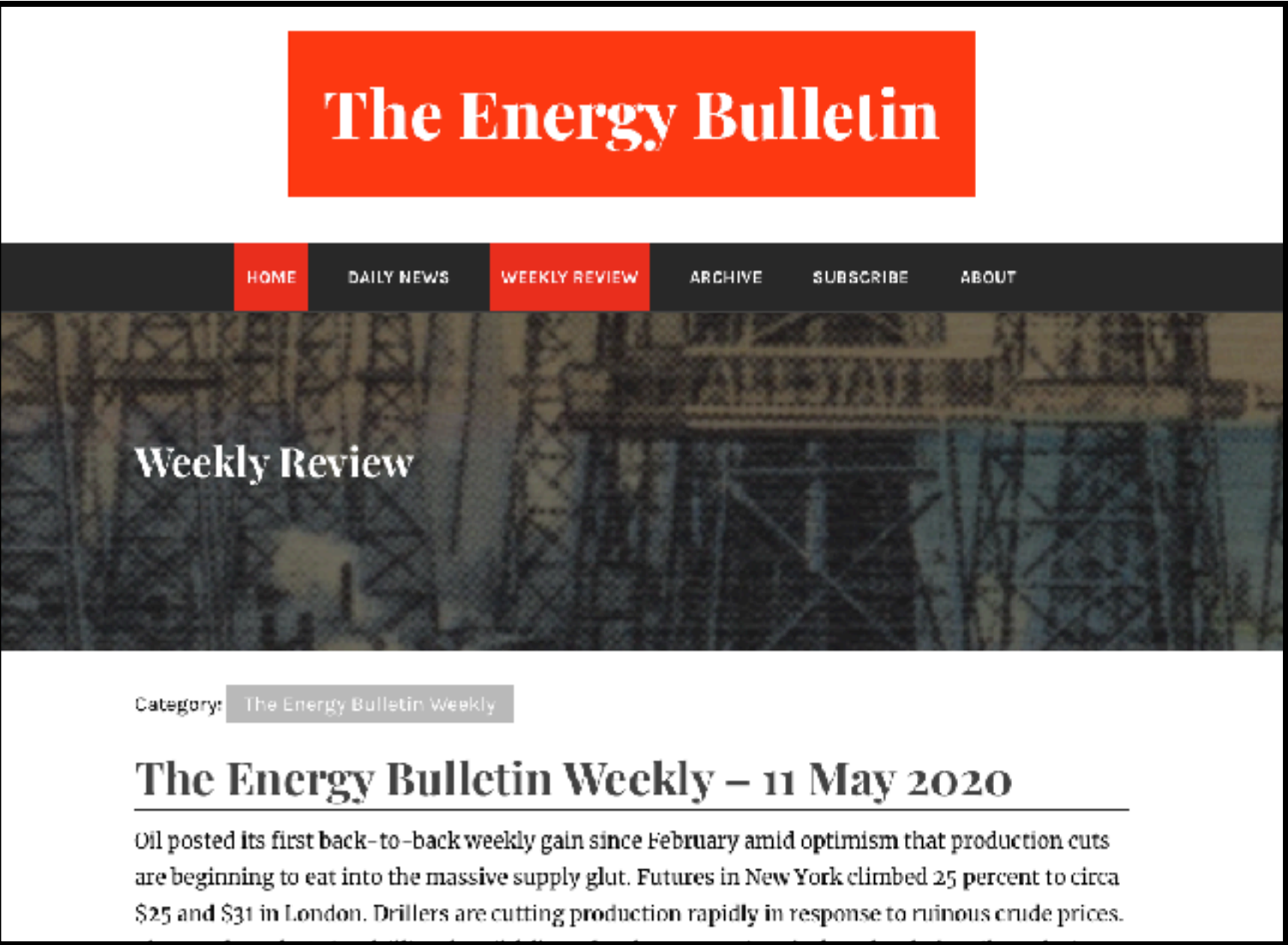
If nothing else satisfies, we can turn to the Doncar



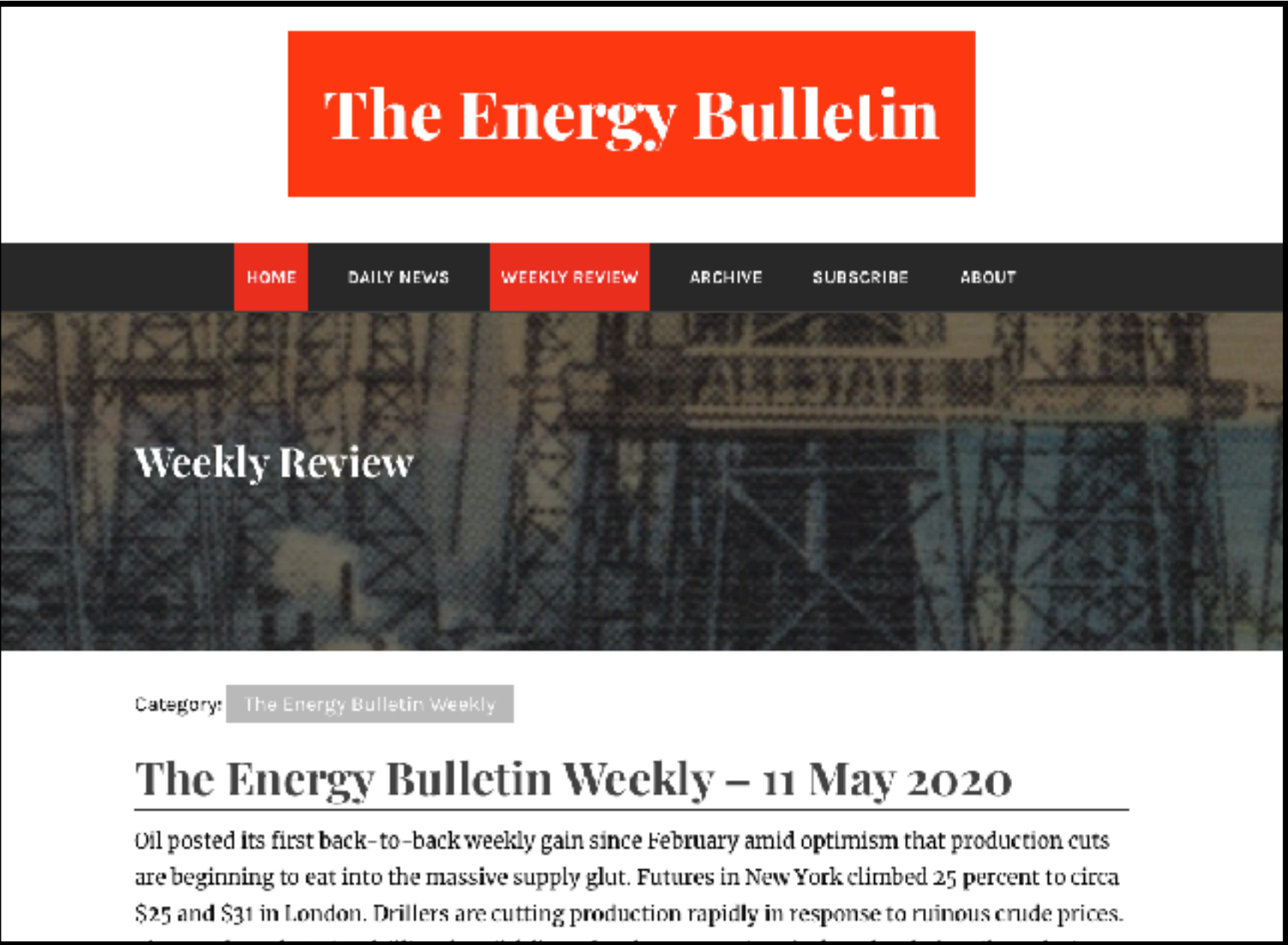
Sherwood Roland discovered the link between CFC's (freon) & the ozone hole, leading to the Montreal Protocol

“What’s the use of having developed a science well enough to make predictions if, in the end, all we’re willing to do is stand around and wait for them to come true?”

My sources are readily accessible

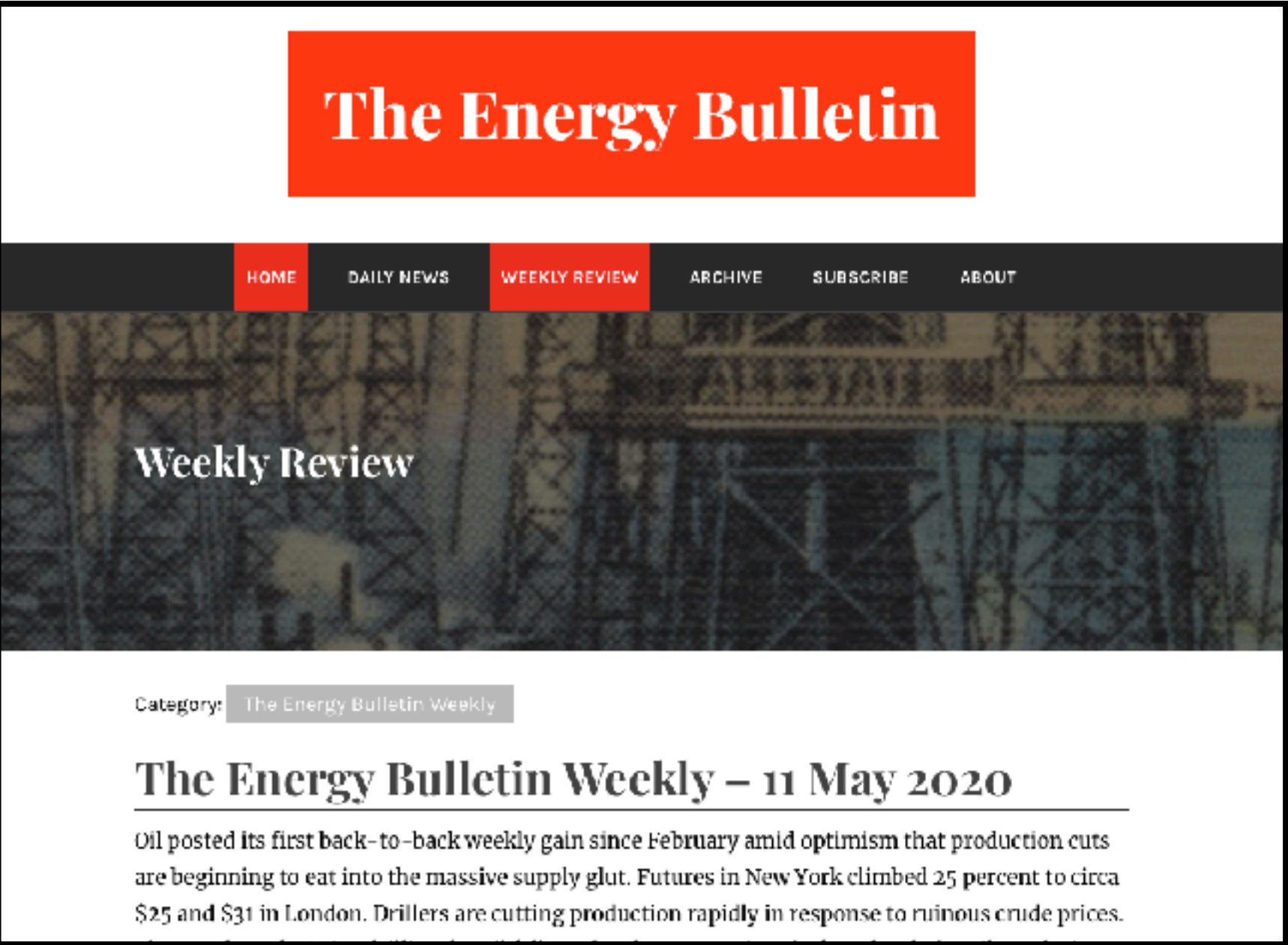


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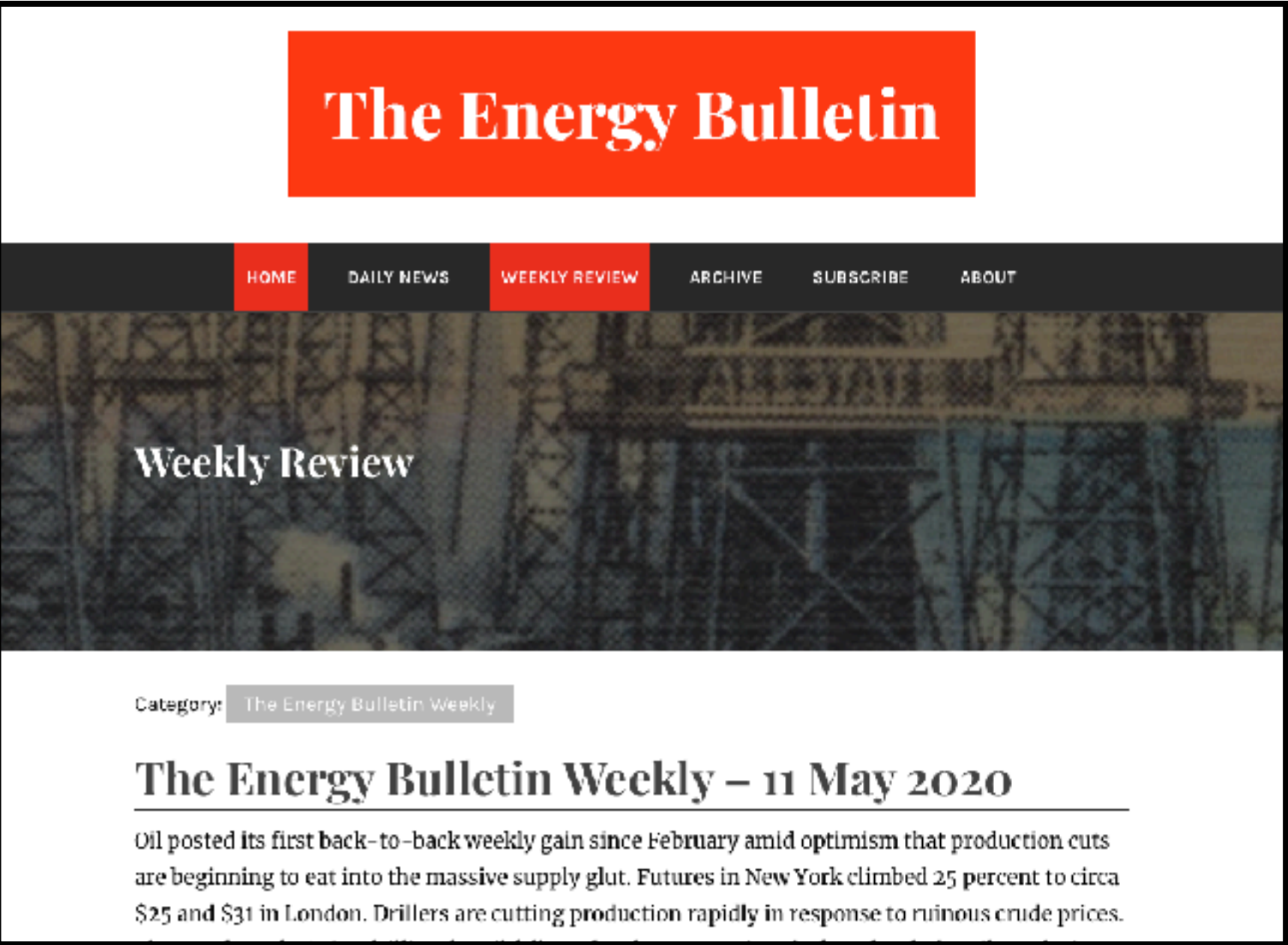
Art Berman

My sources are readily accessible



Art Berman

My sources are readily accessible



The Energy Bulletin

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Category: The Energy Bulletin Weekly

The Energy Bulletin Weekly – 11 May 2020

Oil posted its first back-to-back weekly gain since February amid optimism that production cuts are beginning to eat into the massive supply glut. Futures in New York climbed 25 percent to circa \$25 and \$31 in London. Drillers are cutting production rapidly in response to ruinous crude prices.



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Baker Hughes

SRSrocco REPORT

-35

Rig Count Overview & Summary Count

Area	Last Count	Count	Change from Prior Count	Date of Prior Count	Change from Last Year	Date of Last Year's Count
U.S.	15 May 2020	339	-35	8 May 2020	-648	17 May 2019
Canada	15 May 2020	23	-3	8 May 2020	-40	17 May 2019
International	Apr 2020	915	-144	Mar 2020	-147	Apr 2019



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ANALYSIS CRUDE OIL GASOLINE DISTILLATE PROPANE

Wake up to the power of solar!!!

We are here

