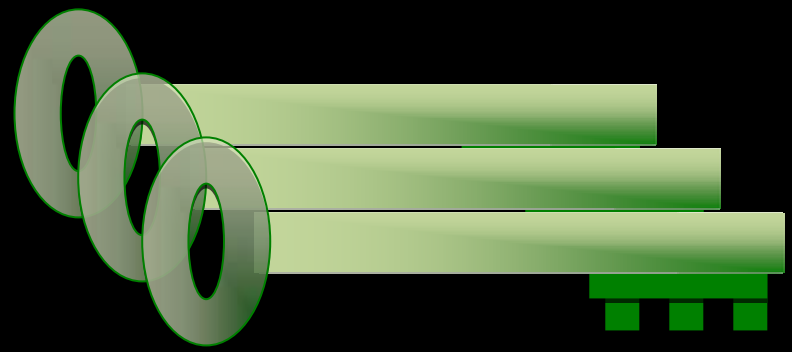
It's Not Your Father's Transportation Program


Sustainability
Climate Change
Smart Growth
?
Recession
Energy
Public Health
Safety
Congestion

Keys to the Future

3 Keys



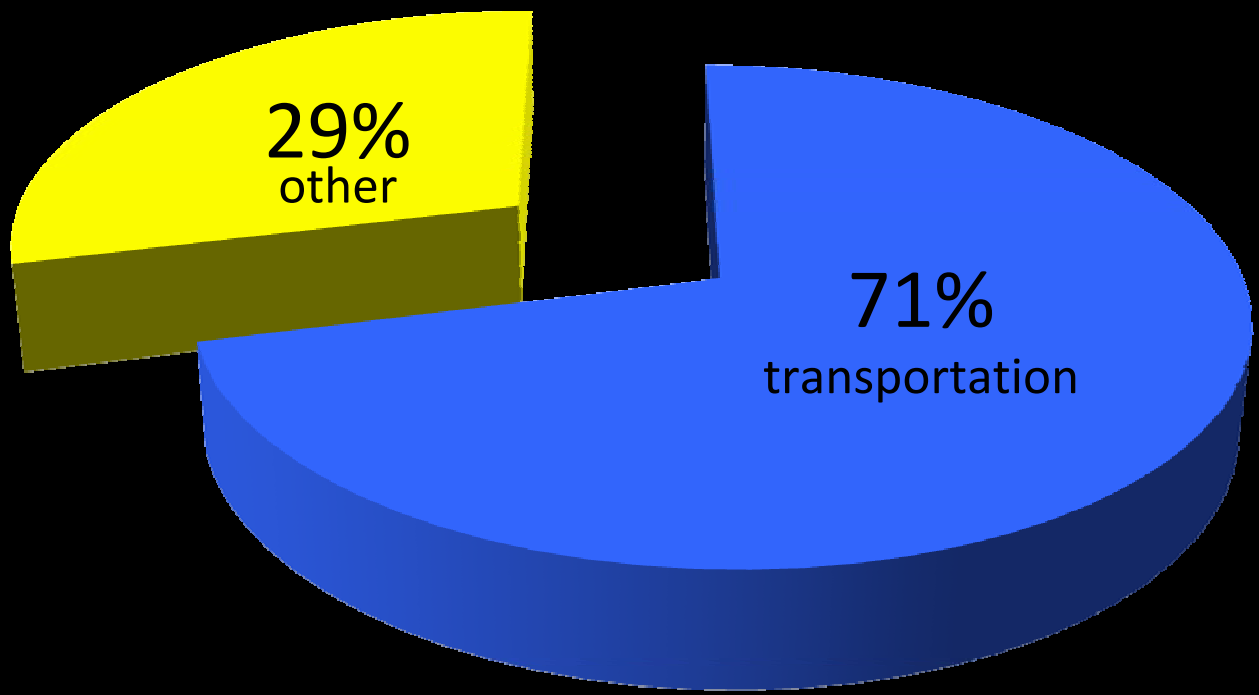
Energy
Public Health
Modern Streets

1

Energy

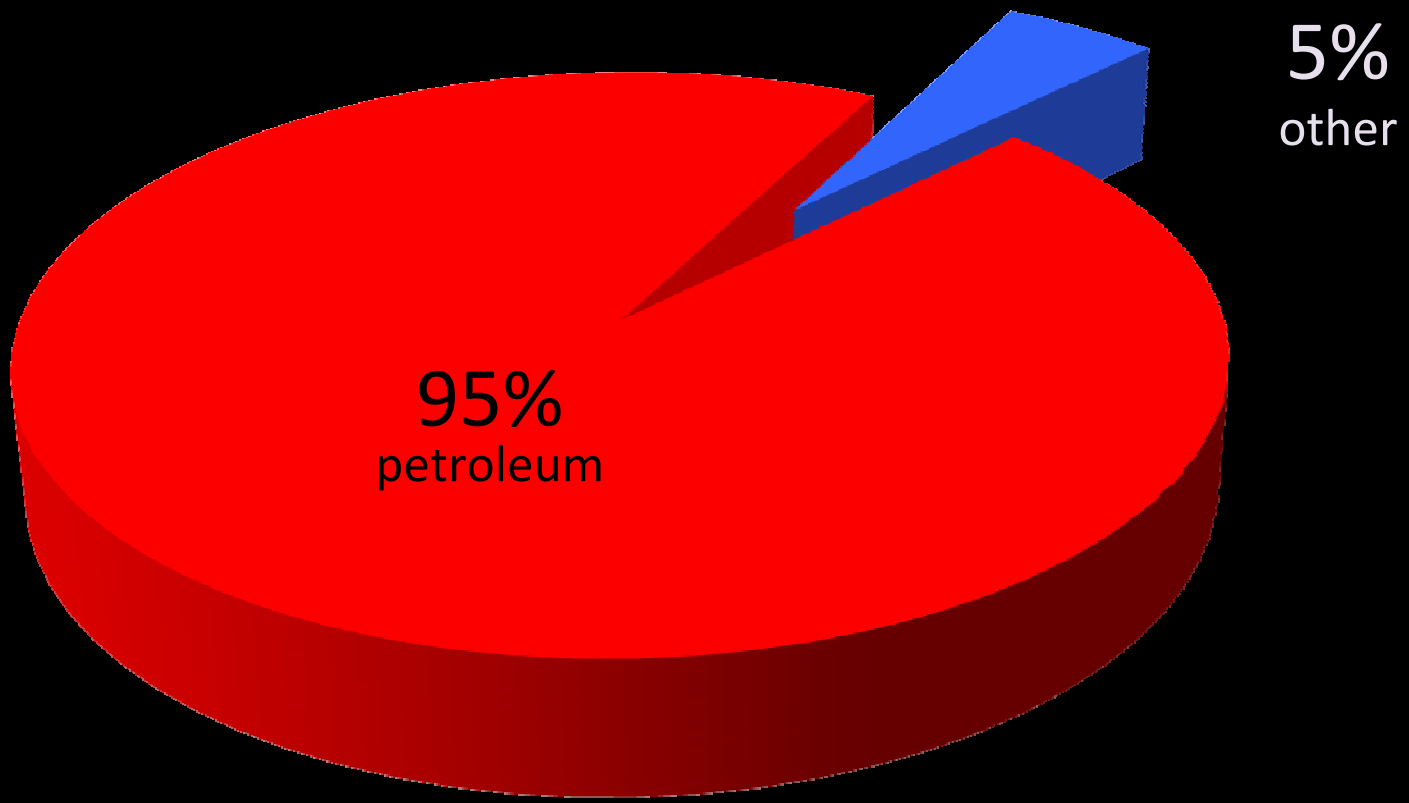
Petroleum Dependency

How petroleum is used in the US



EIA, 2008

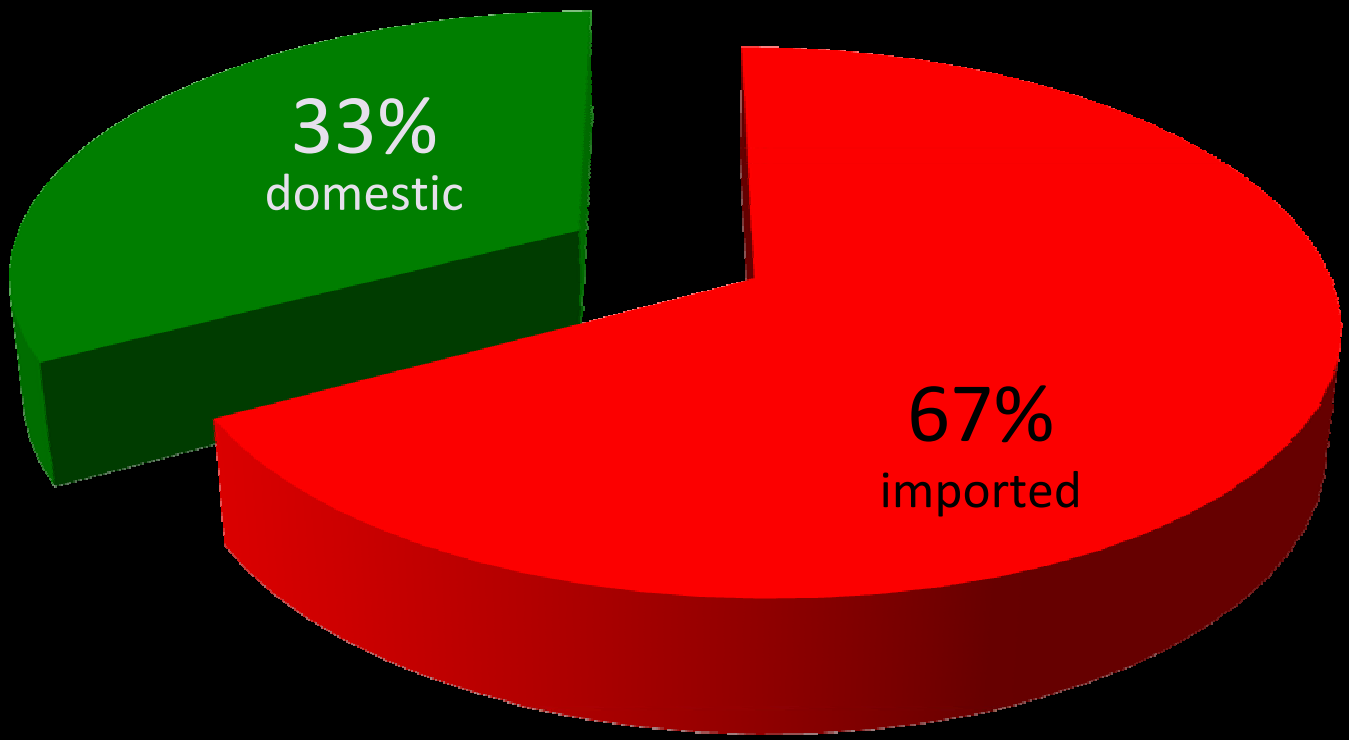
Sources of energy for transportation in the US



EIA, 2008

Our transportation systems are almost entirely dependent on oil

Where our oil comes from



2008 US Net Petroleum Trade Deficit: $300 B

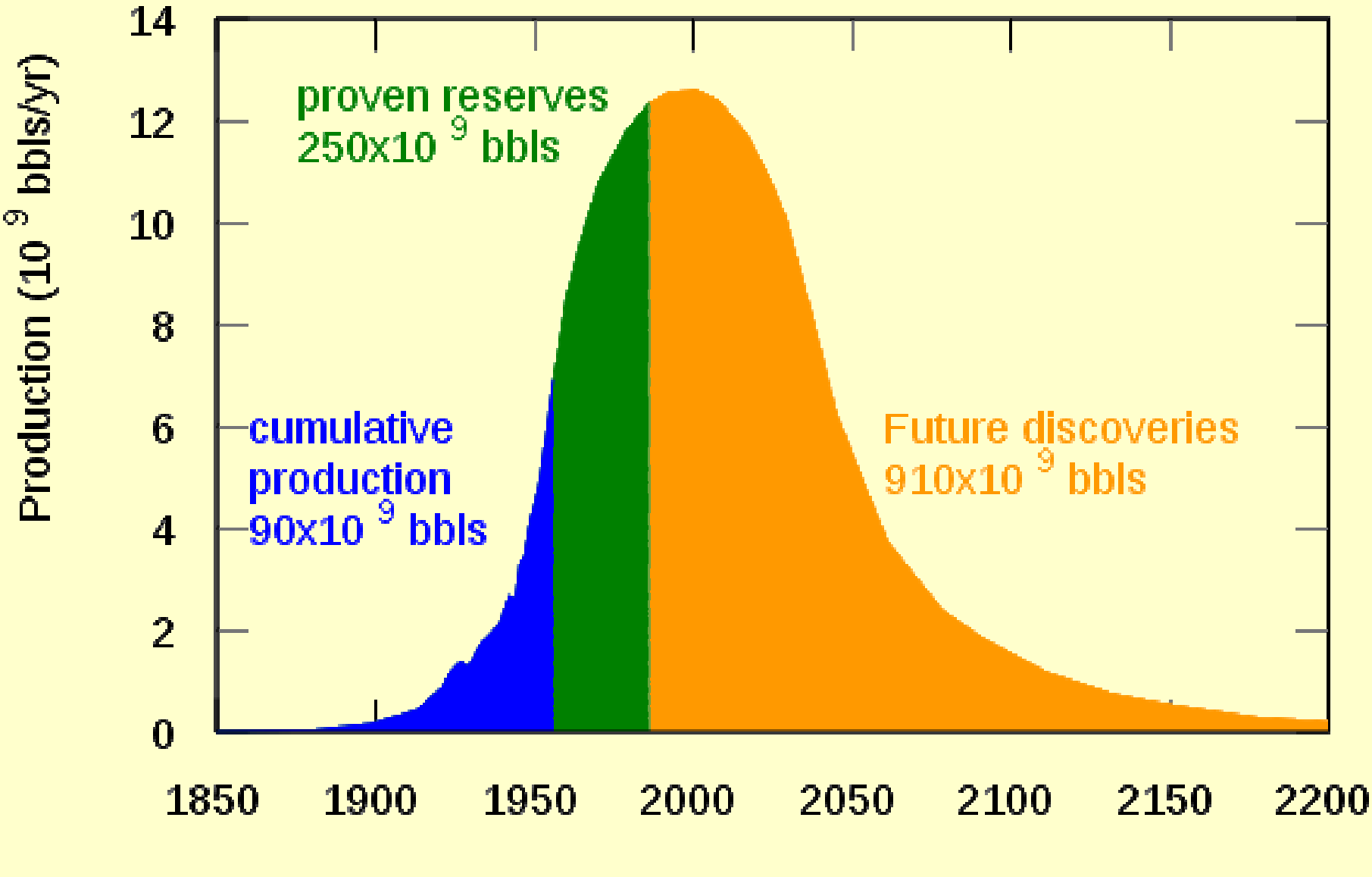
EIA, 2008

Our transportation systems are almost entirely dependent on oil

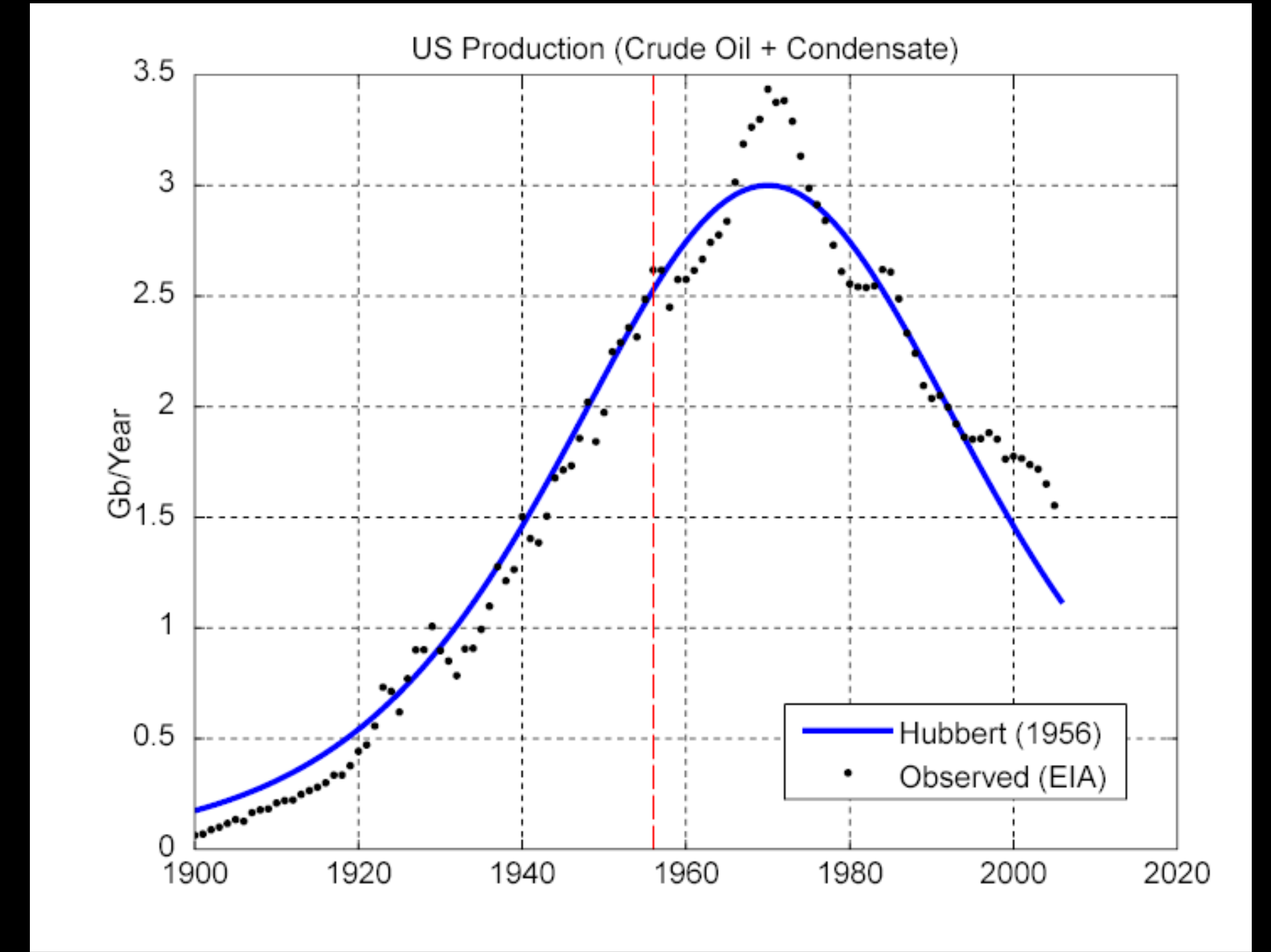
imported

“Peak Oil”

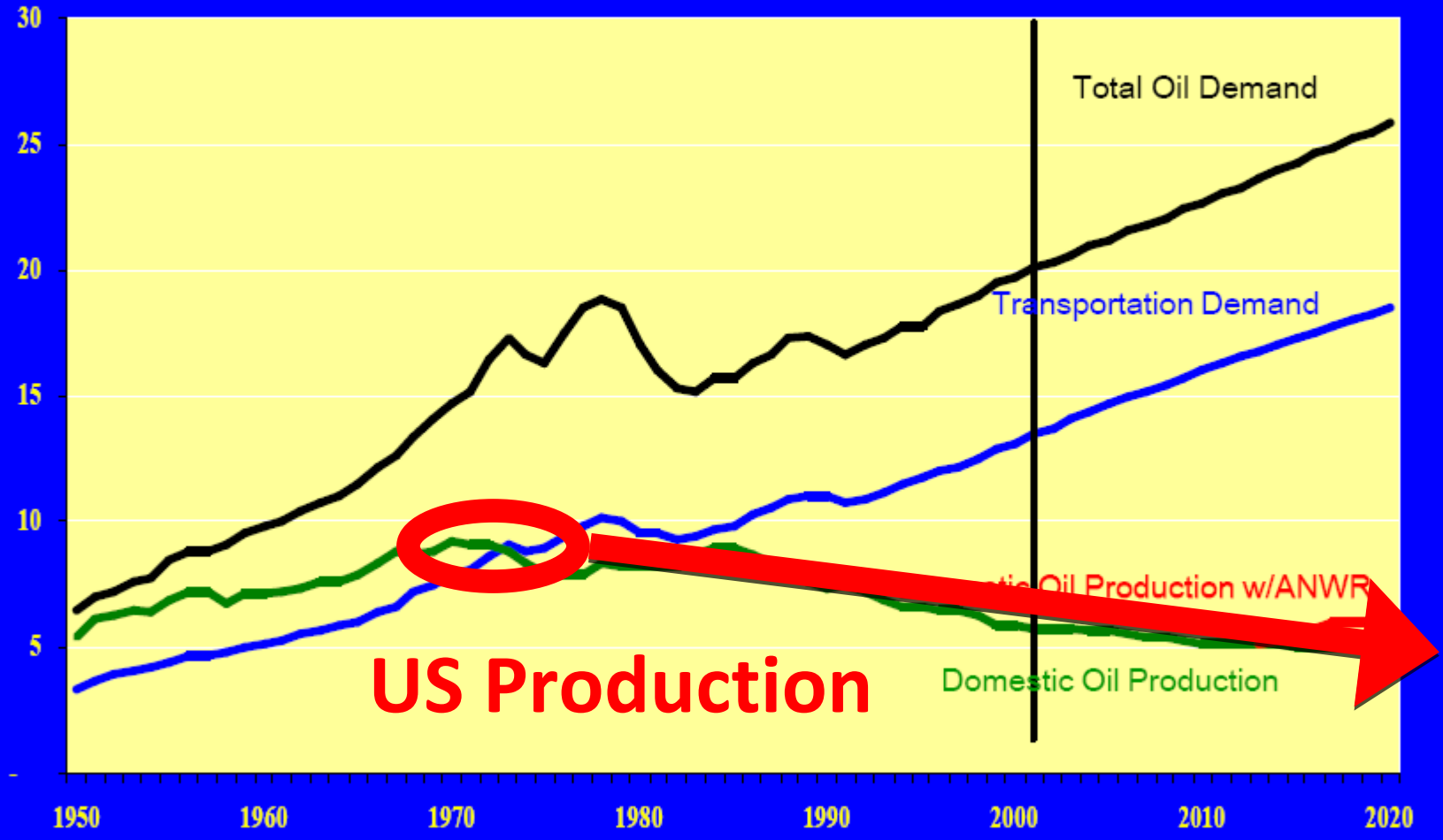
The Original Hubbert Curve



M. King Hubbert (1956)

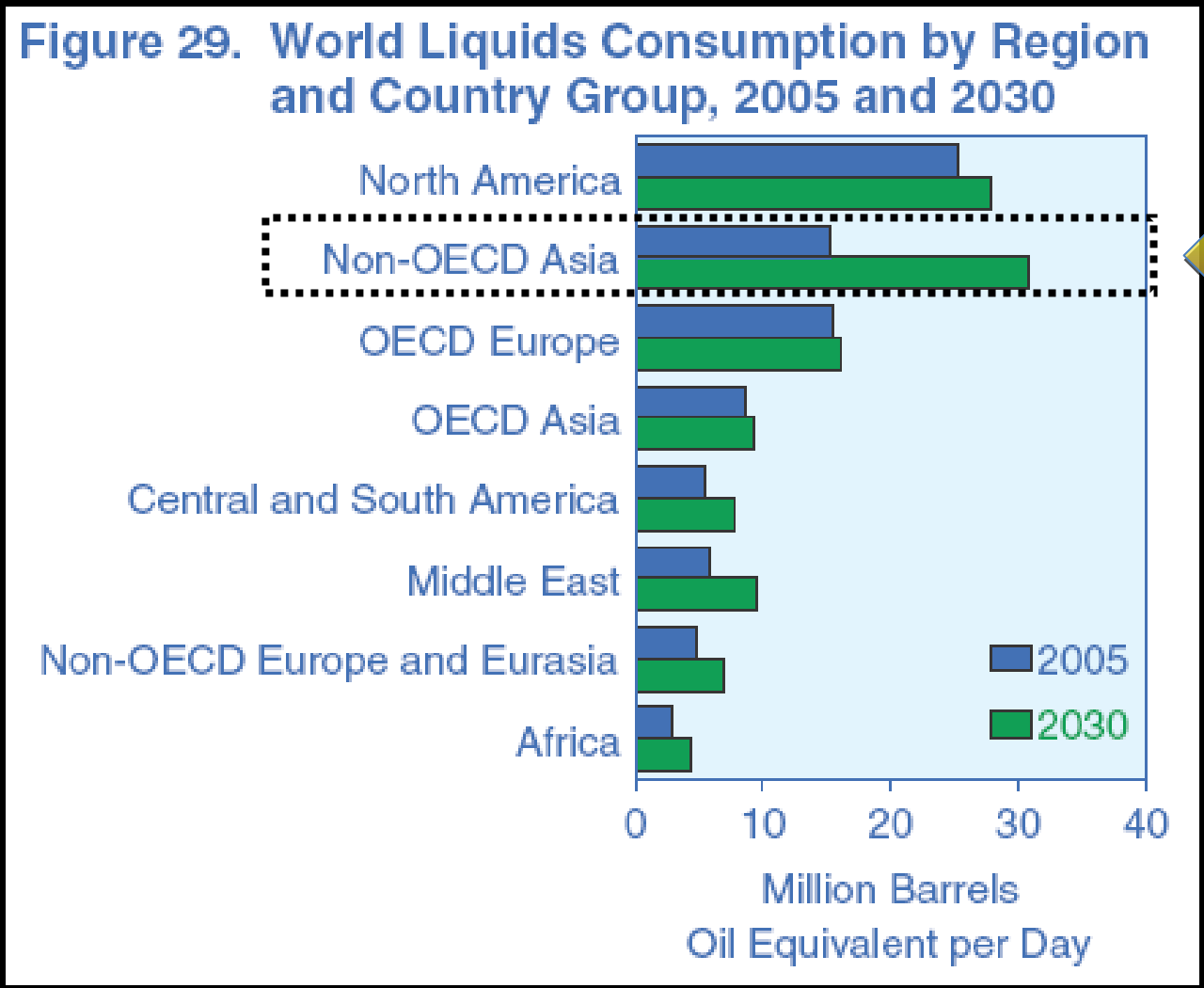

US Production (Crude Oil + Condensate)
Gb/Year
3.5
3
2.5
2
1.5
1
0.5
0
1900
1920
1940
1960
1980
2000
2020
Hubbert (1956)
Observed (EIA)

US Oil Consumption (million barrels per day)



EIA, Annual Energy Outlook 2001; "Potential Oil Production from the Coastal Plain of ANWR," - EIA Reserves & Production Division

Petroleum Demand by World Region



India & China will double their demand for petroleum by 2030

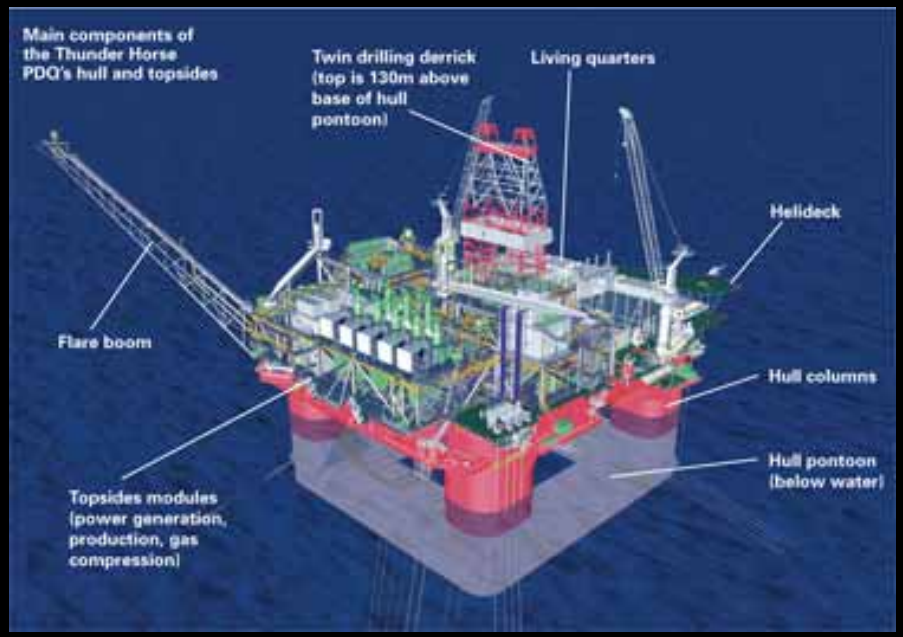
Source: United States Energy Information Administration, International Energy Outlook 2008

The oil is not gone…

…but the cheap oil is gone.

Those were the days!

BP's Thunder Horse Field Production Facility Cost: $1 billion



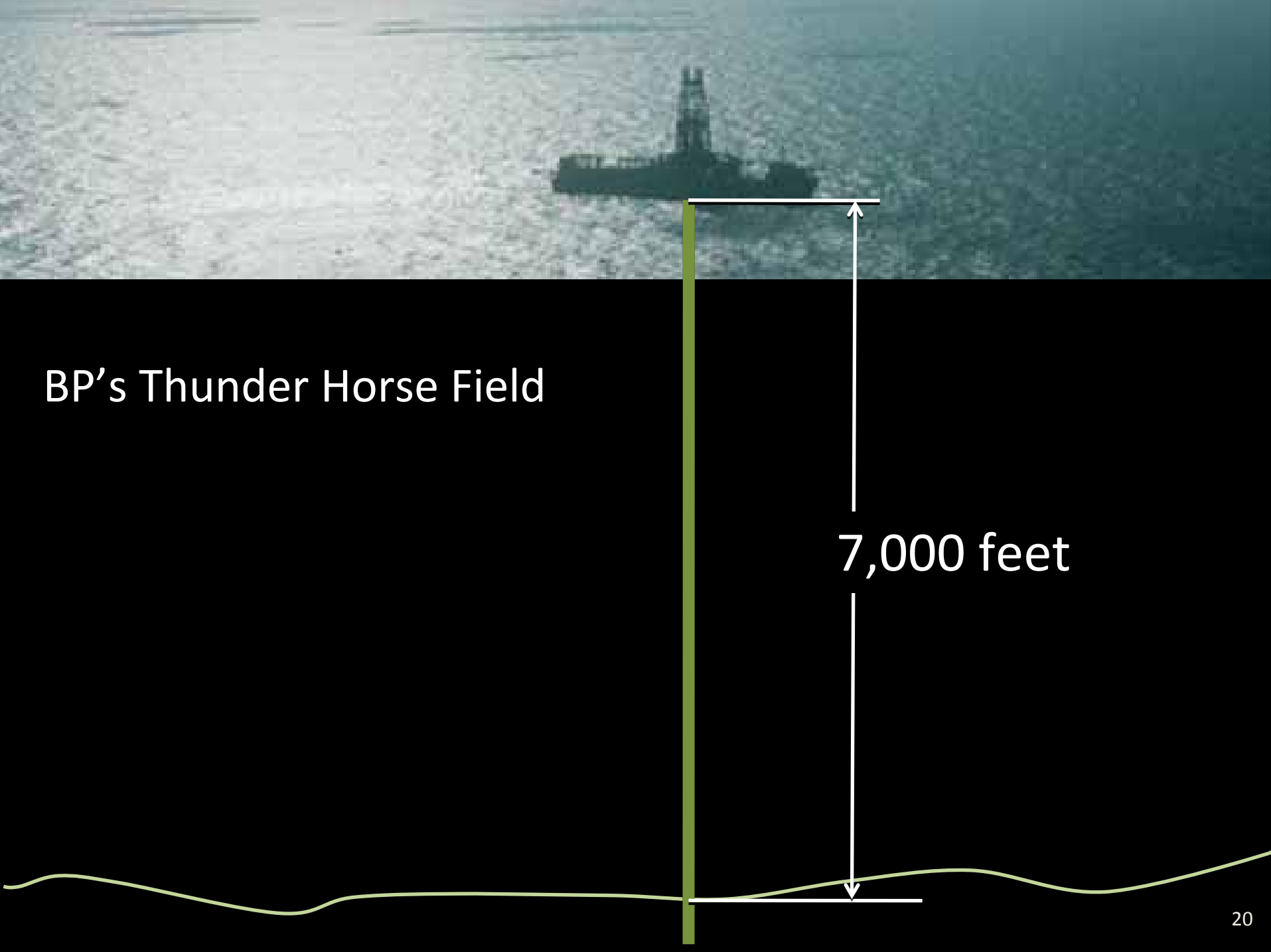
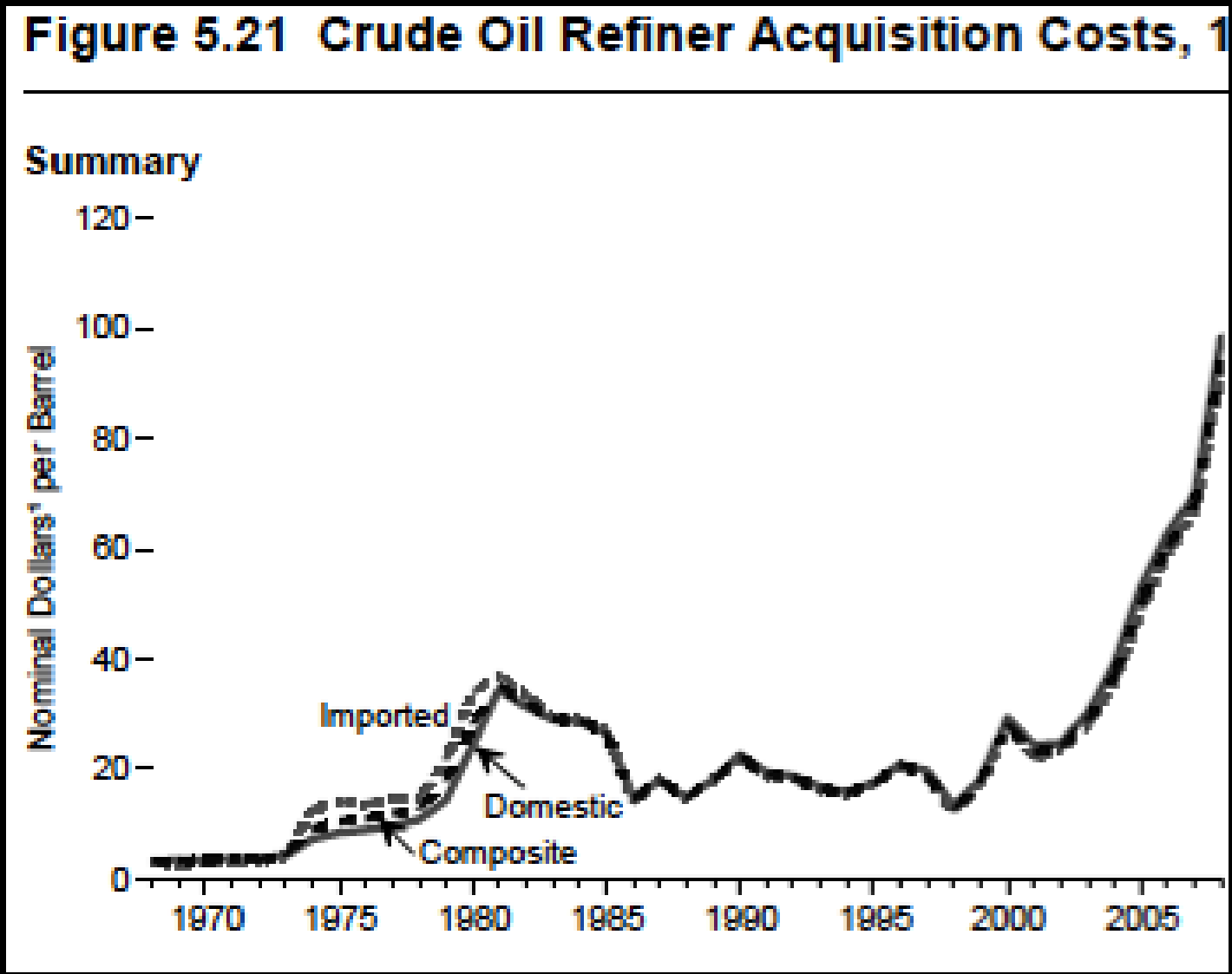
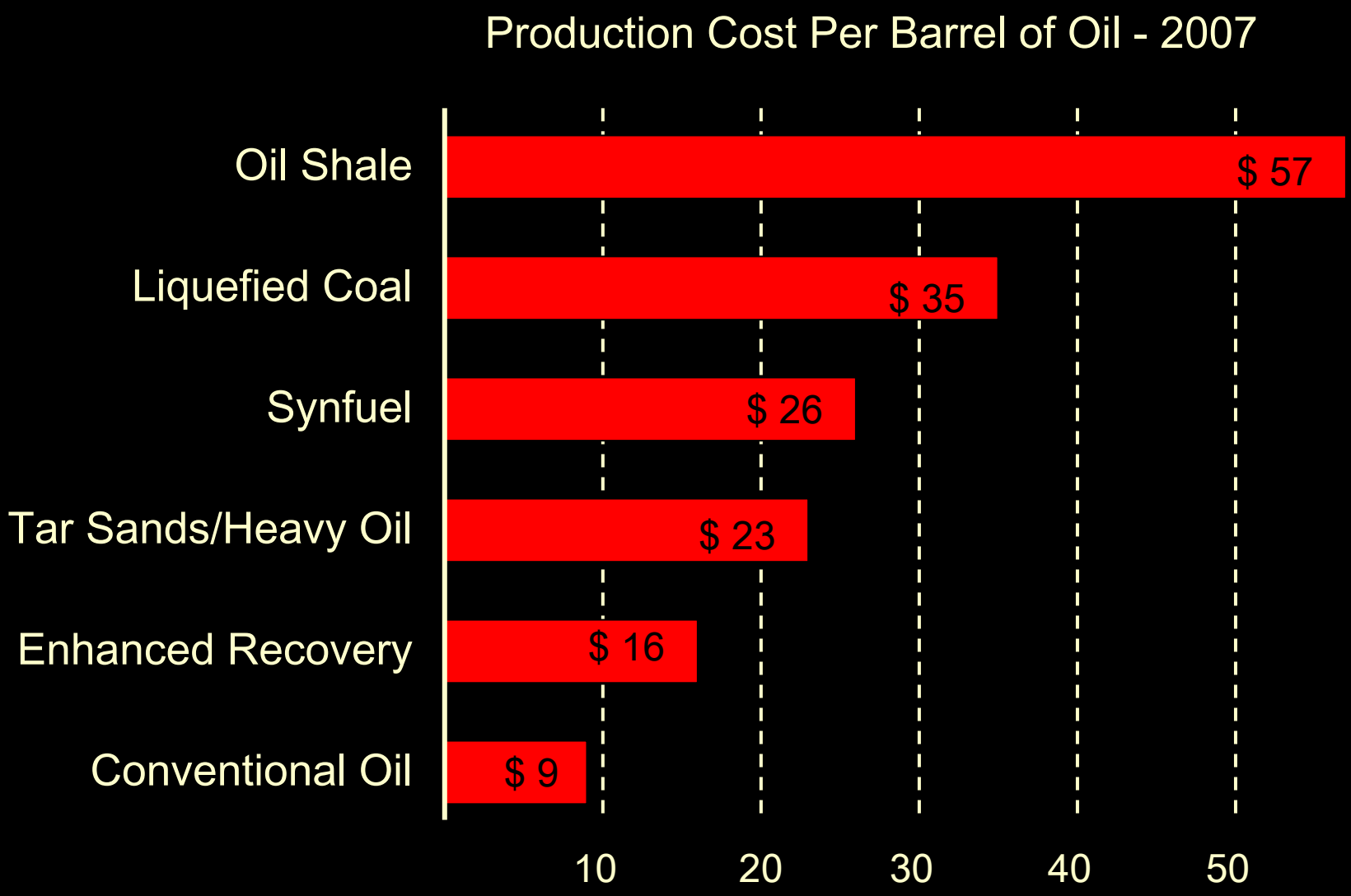

BP’s Thunder Horse Field
7,000 feet

Figure 5.21 Crude Oil Refiner Acquisition Costs, 1



Source: Energy Information Administration

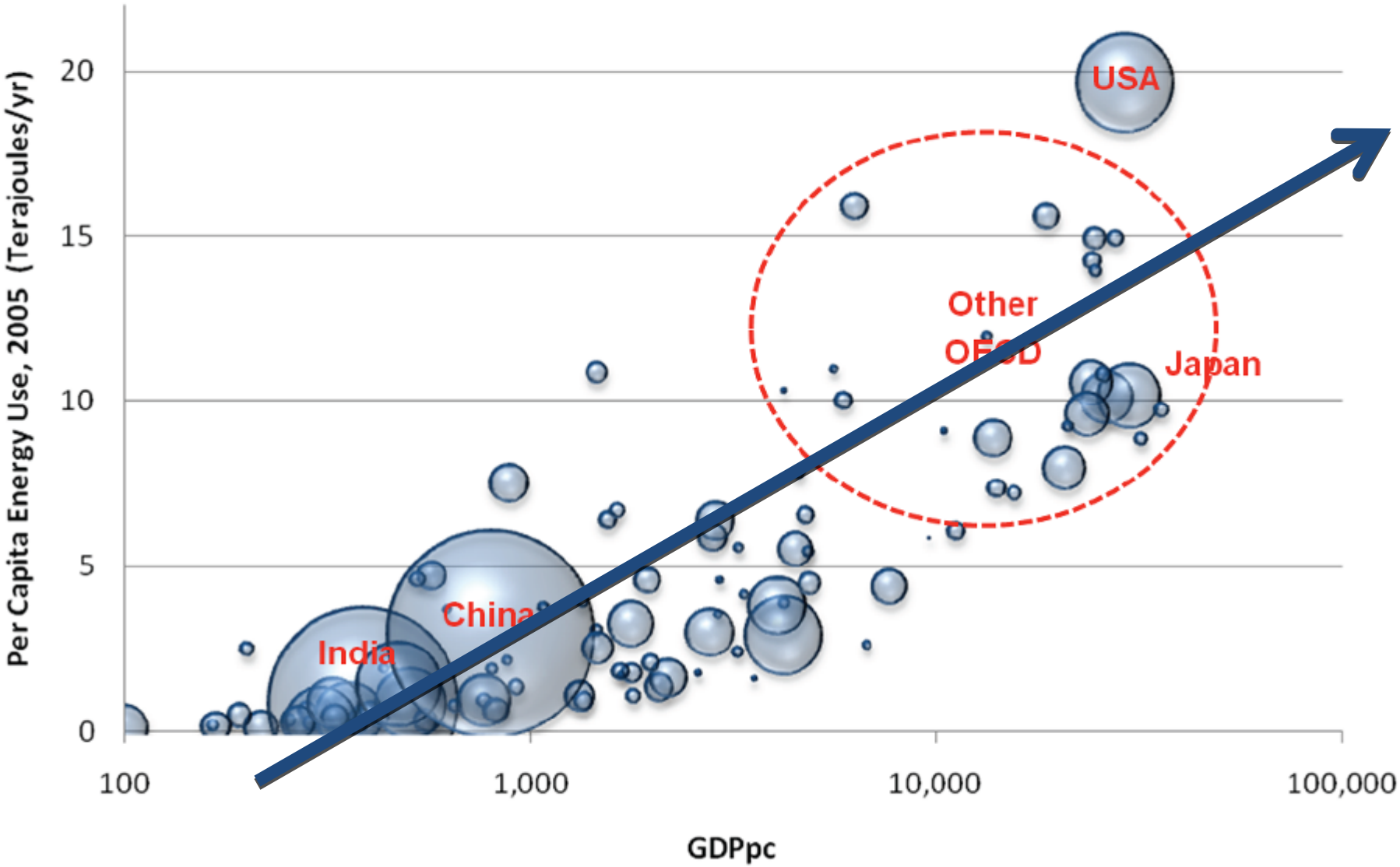
Production Cost – Sources of Oil



Source: Brandt & Farrell, UC Berkeley

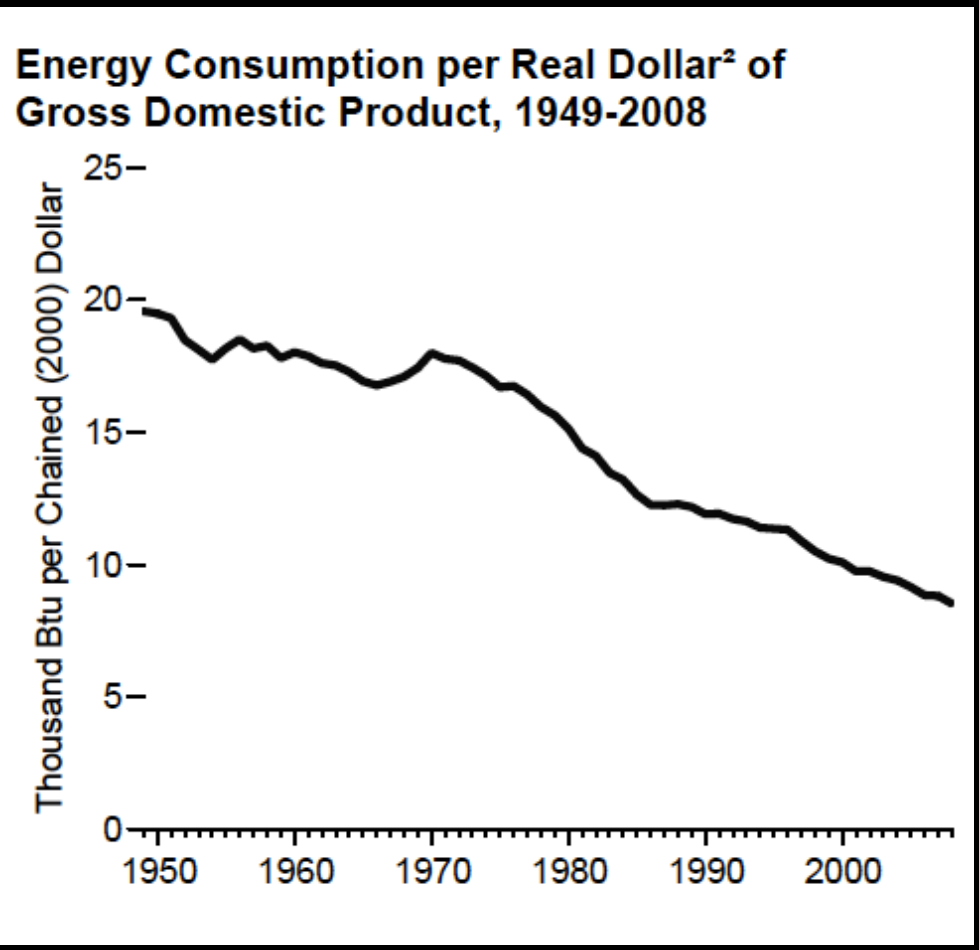
Will energy prices control our economic growth?

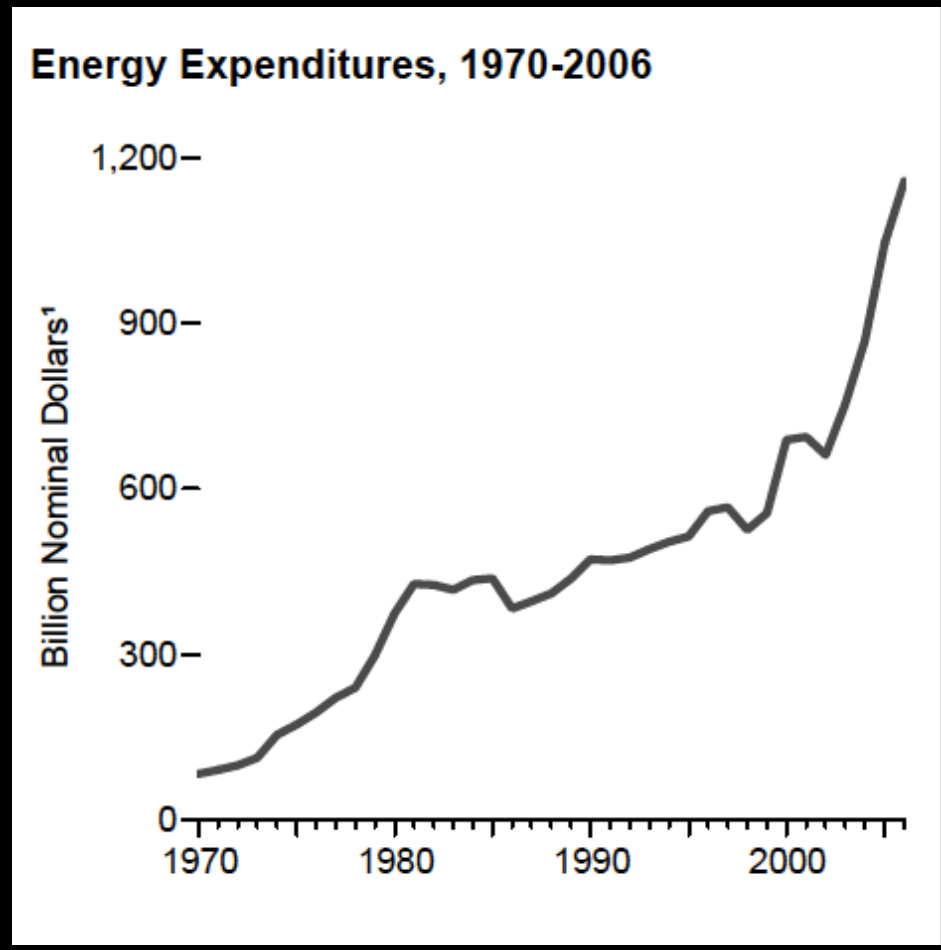
Figure 3: Energy and Income, by Country, Income, and Population (2005)



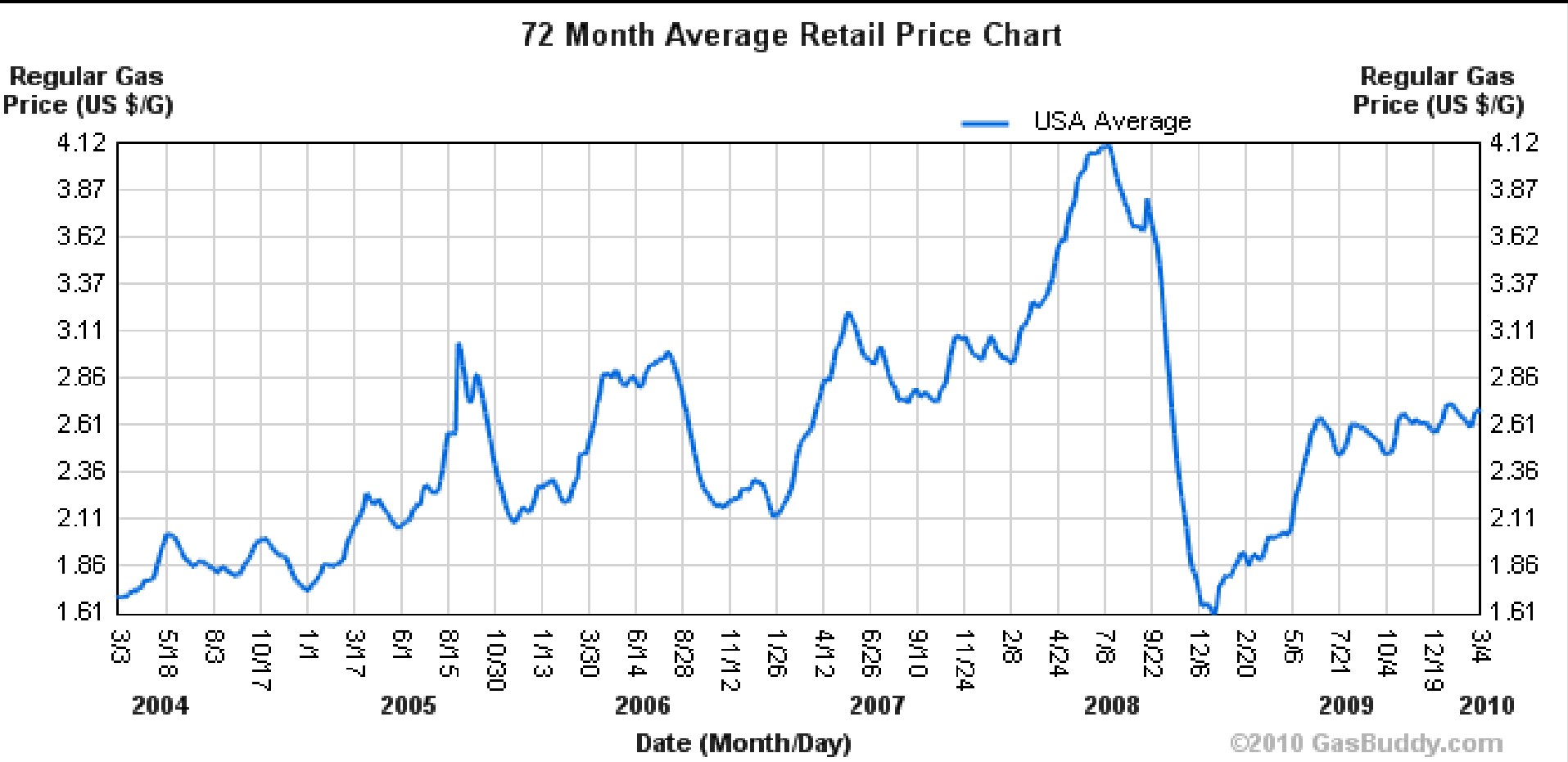
Source: Energy Pathways for the California Economy, UC Berkeley, June 2009

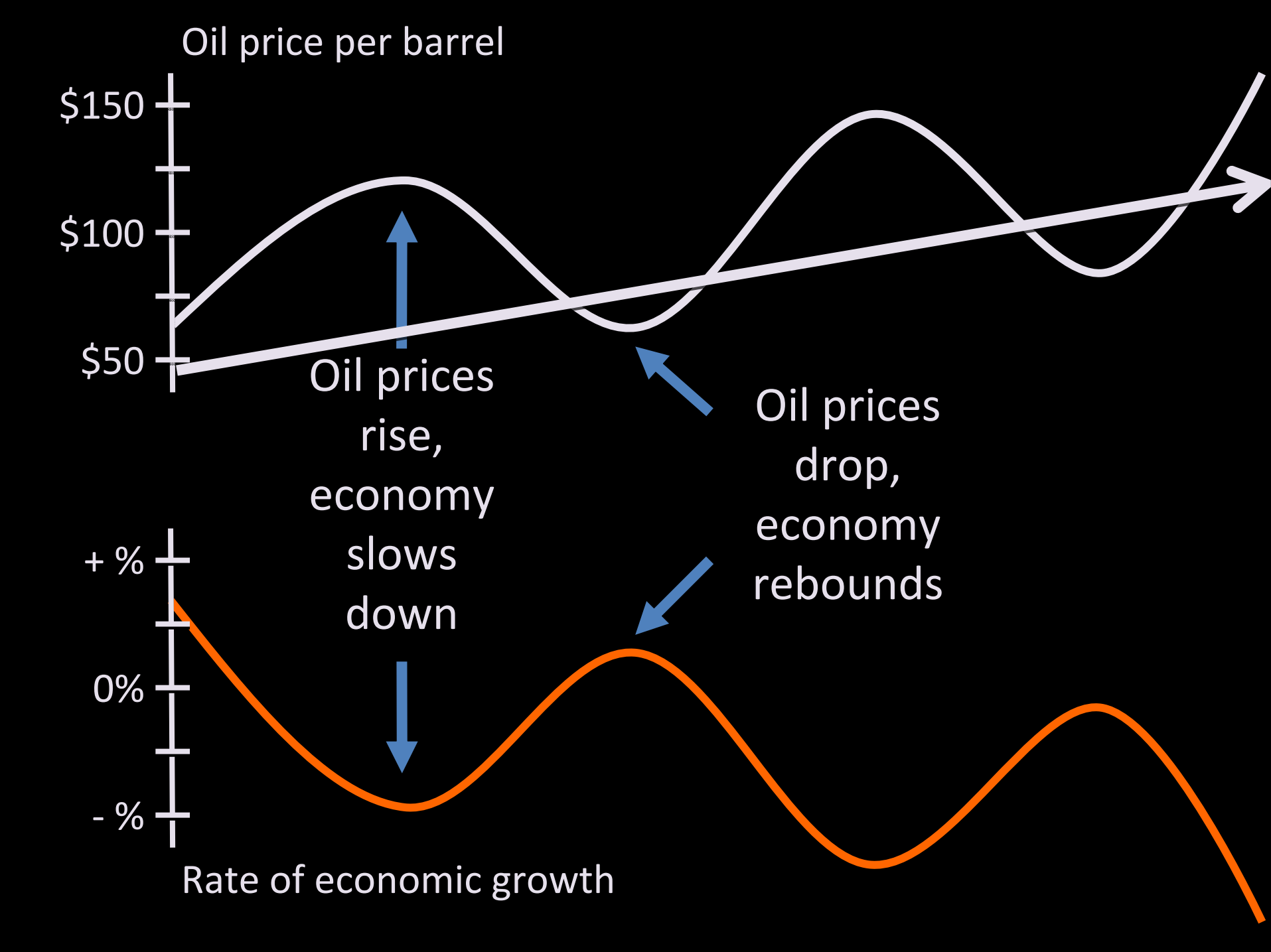
We have used cheap energy to drive economic growth

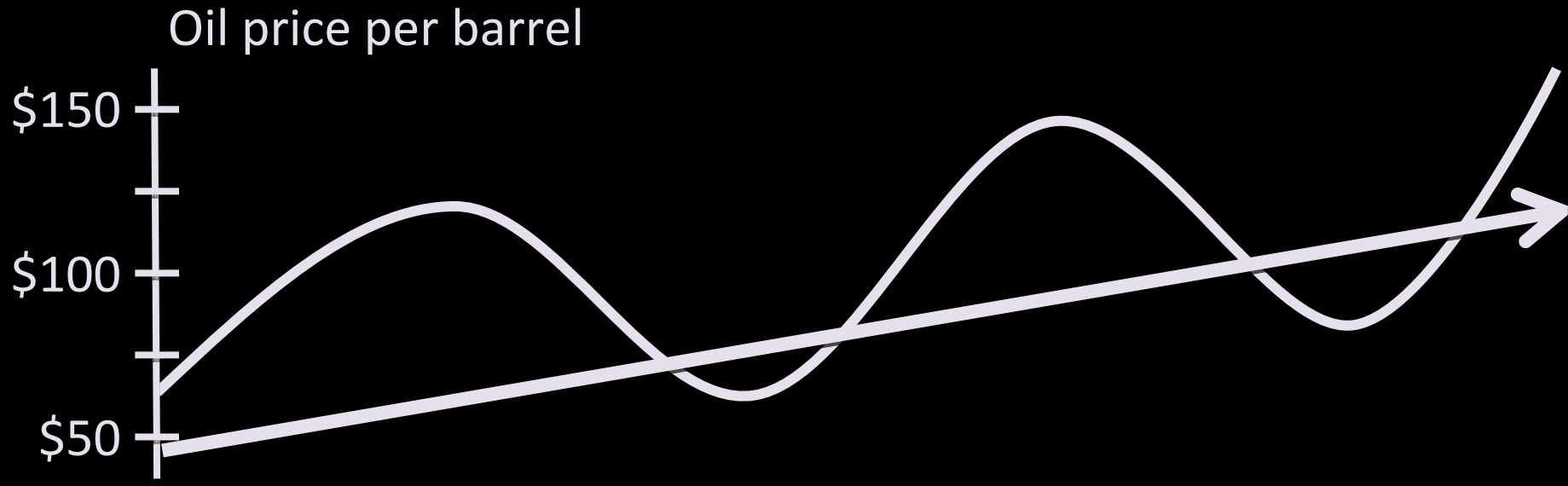




Volatile Gas Prices




Oil price per barrel
$150
$100
$50
Oil prices rise, economy slows down
Oil prices drop, economy rebounds
+ %
0%
- %
Rate of economic growth



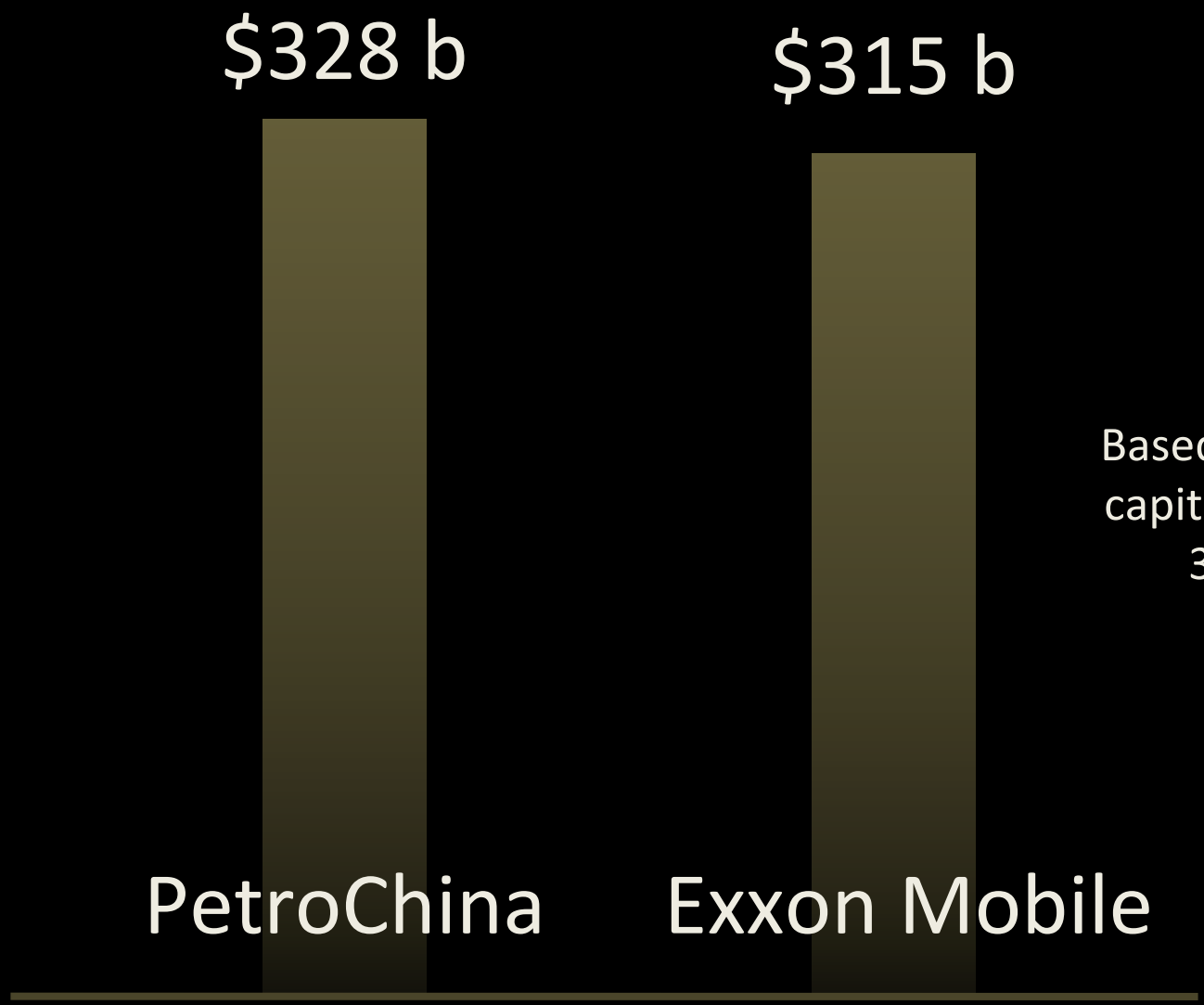
“playing ping pong on a train”

EIA 2011 Fuels Outlook

Crude Oil	$80/barrel
Gasoline	$3.00/gallon

Energy Information Administration – September 14, 2010

World's Two Largest Companies

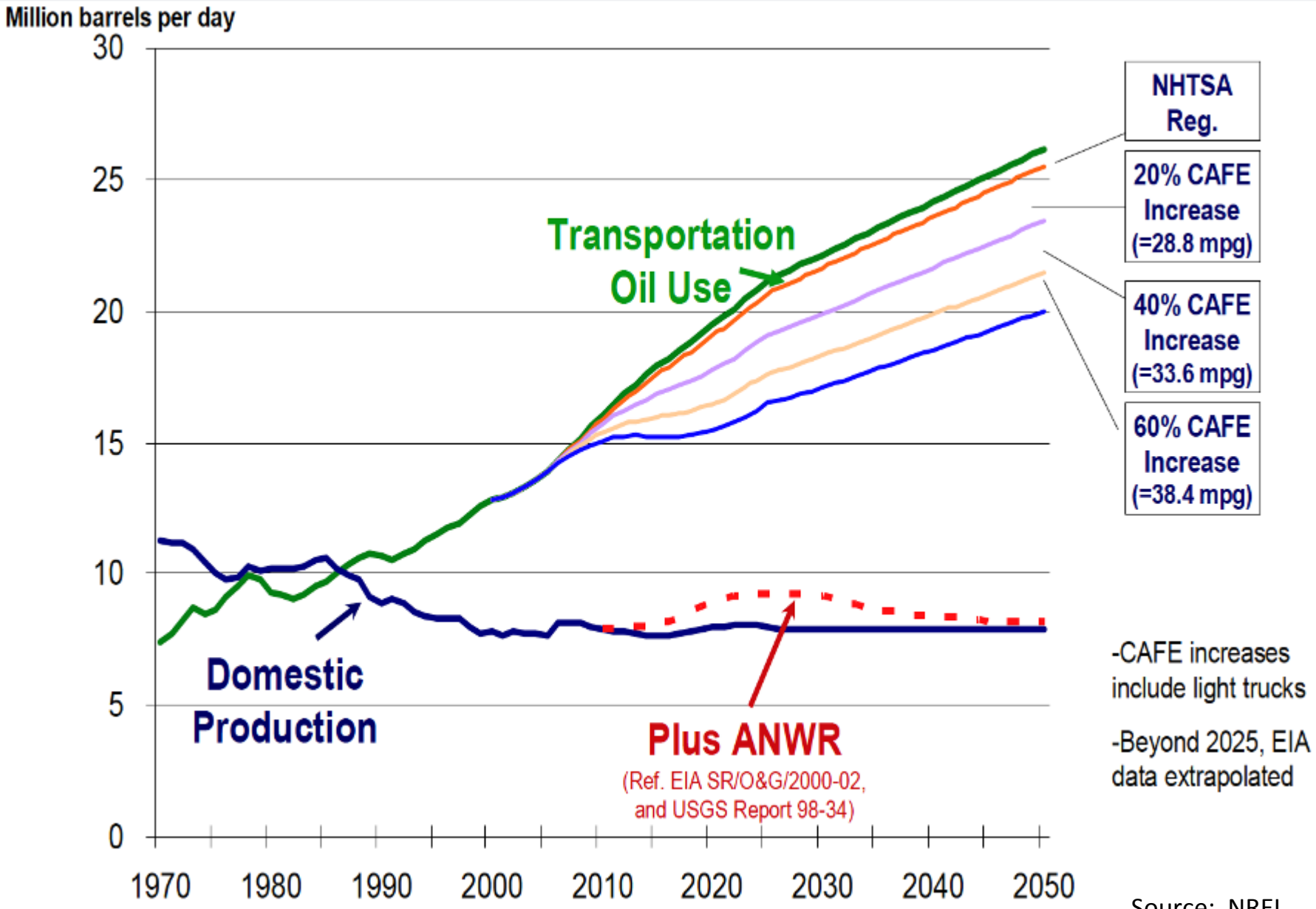


Based on market capitalization on 3/23/10

Source: New York Times 3/24/10

Maybe technology will save us?

Potential Reduction in Petroleum Consumption Through Technology



Source: NREL

Electric cars have a role to play, but…

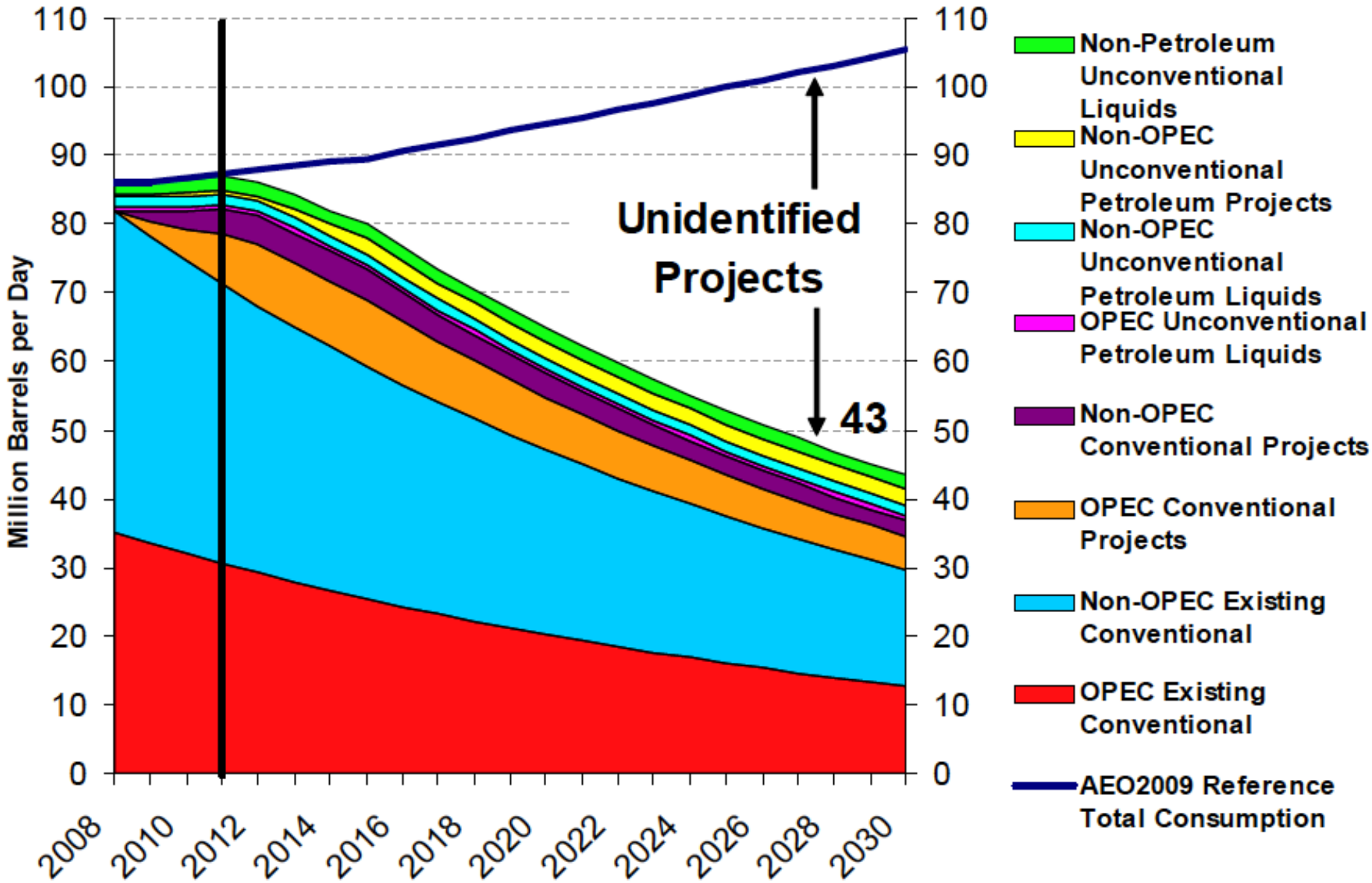
…will be expensive and…

…will create energy demand issues.

Total Motor Vehicles in Service in US in 2010	250,000,000
Total Electric Autos in Service by End of 2012	100,000

0.04%

World's Liquid Fuels Supply

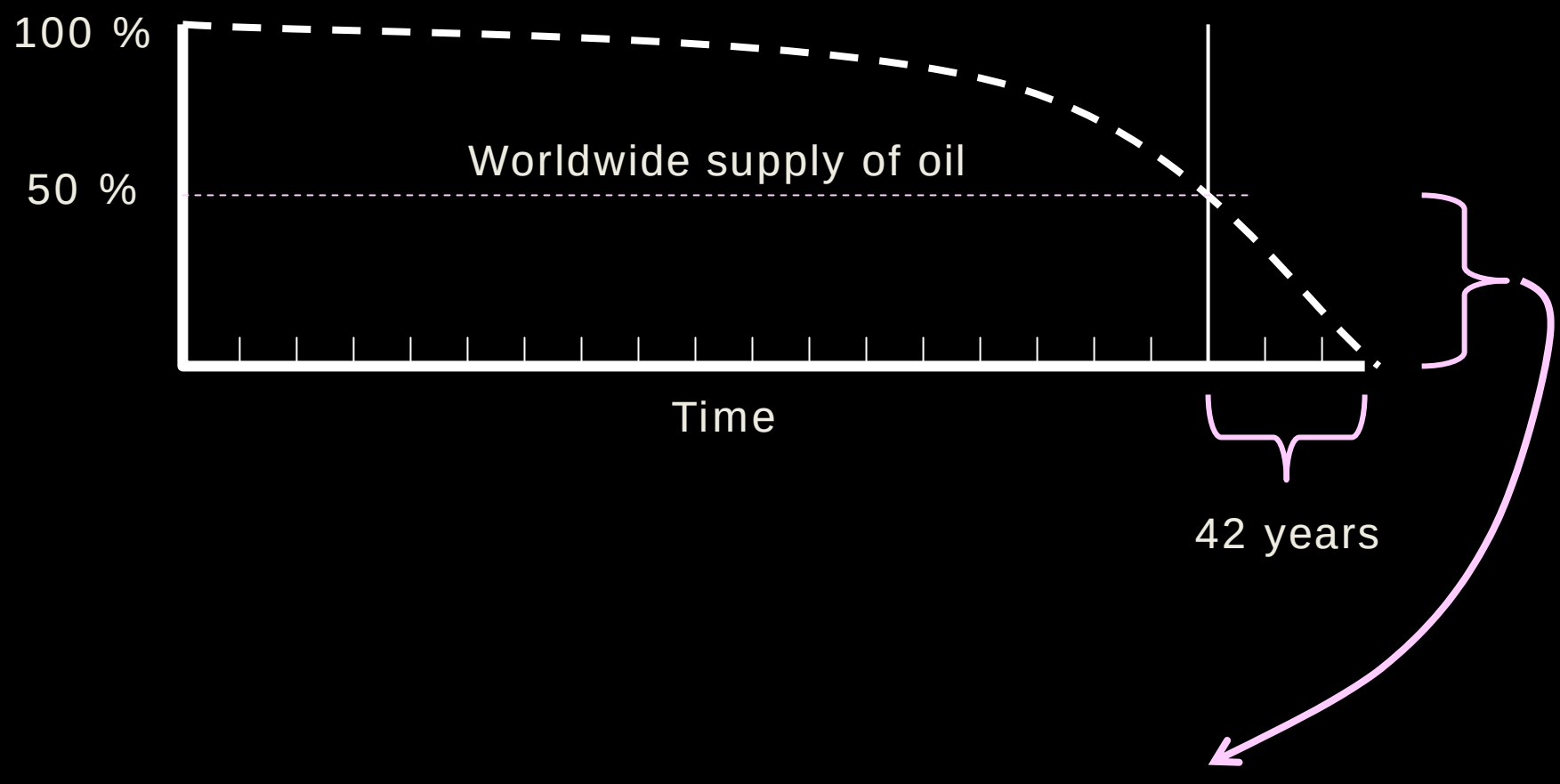


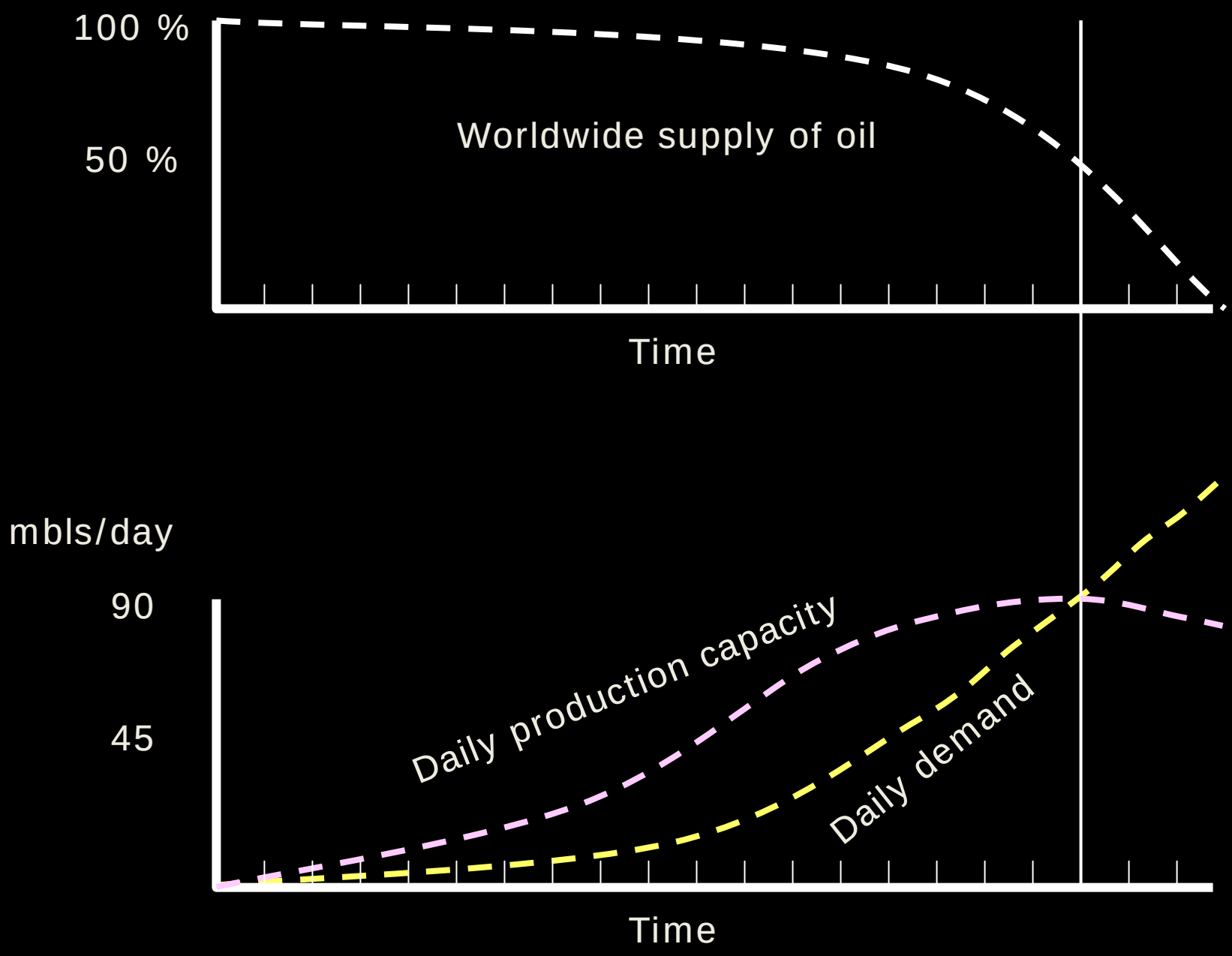
Source: EIA, AEO2009

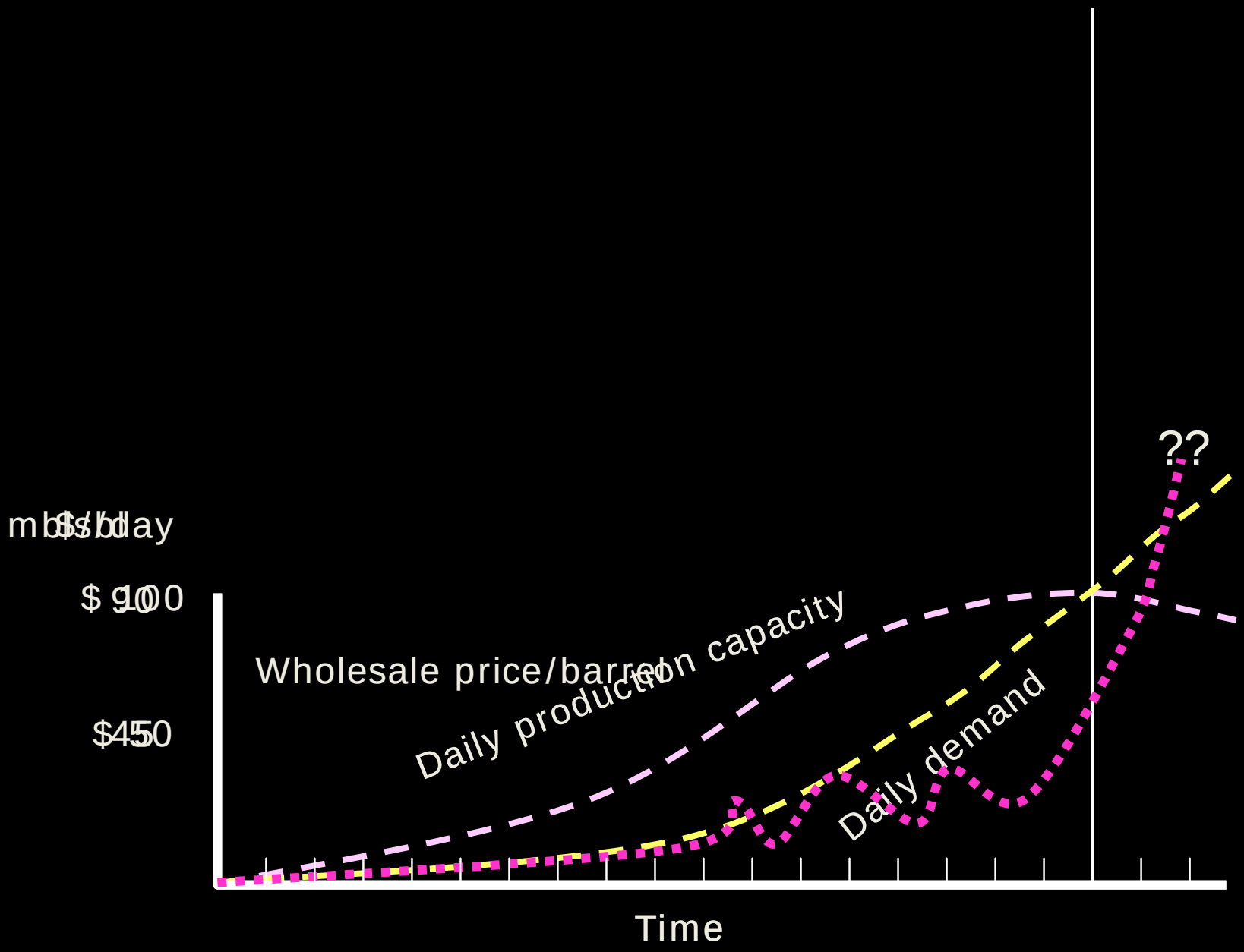
We have not “run out of” oil

The stone age did not end…

…because we “ran out of” stones


100 %
50 %
Worldwide supply of oil
Time
42 years
1.3 trillion barrels


100 %
50 %
Worldwide supply of oil
Time
mbls/day
90
45
Daily production capacity
Daily demand
Time


??
mbbl/day
$/bbl
$100
$50
Wholesale price/barrel
Daily production capacity
Daily demand
Time

The oil is not gone…

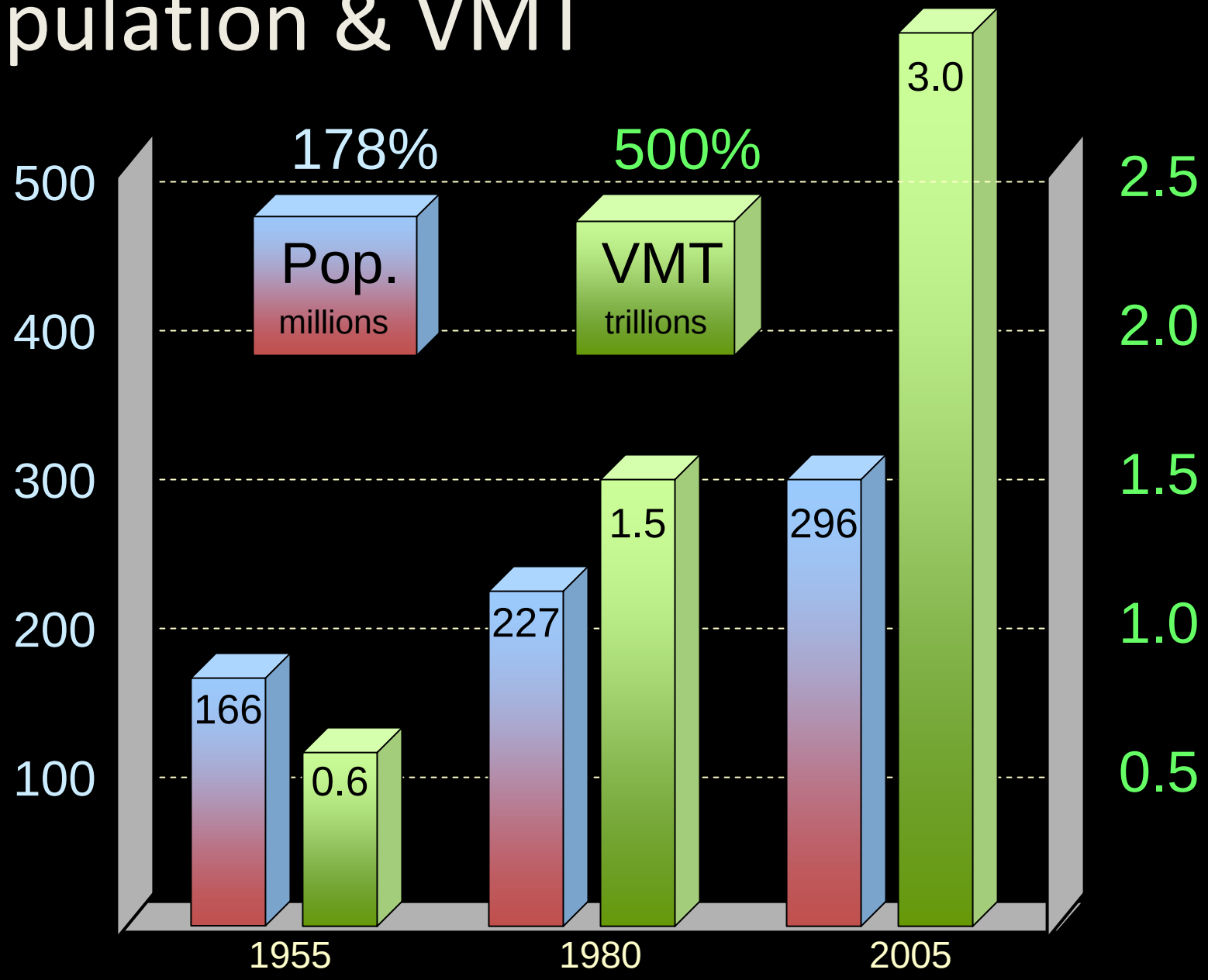
…but the cheap oil is gone.

US travel behavior is already changing…

VMT –
Vehicle Miles of Travel

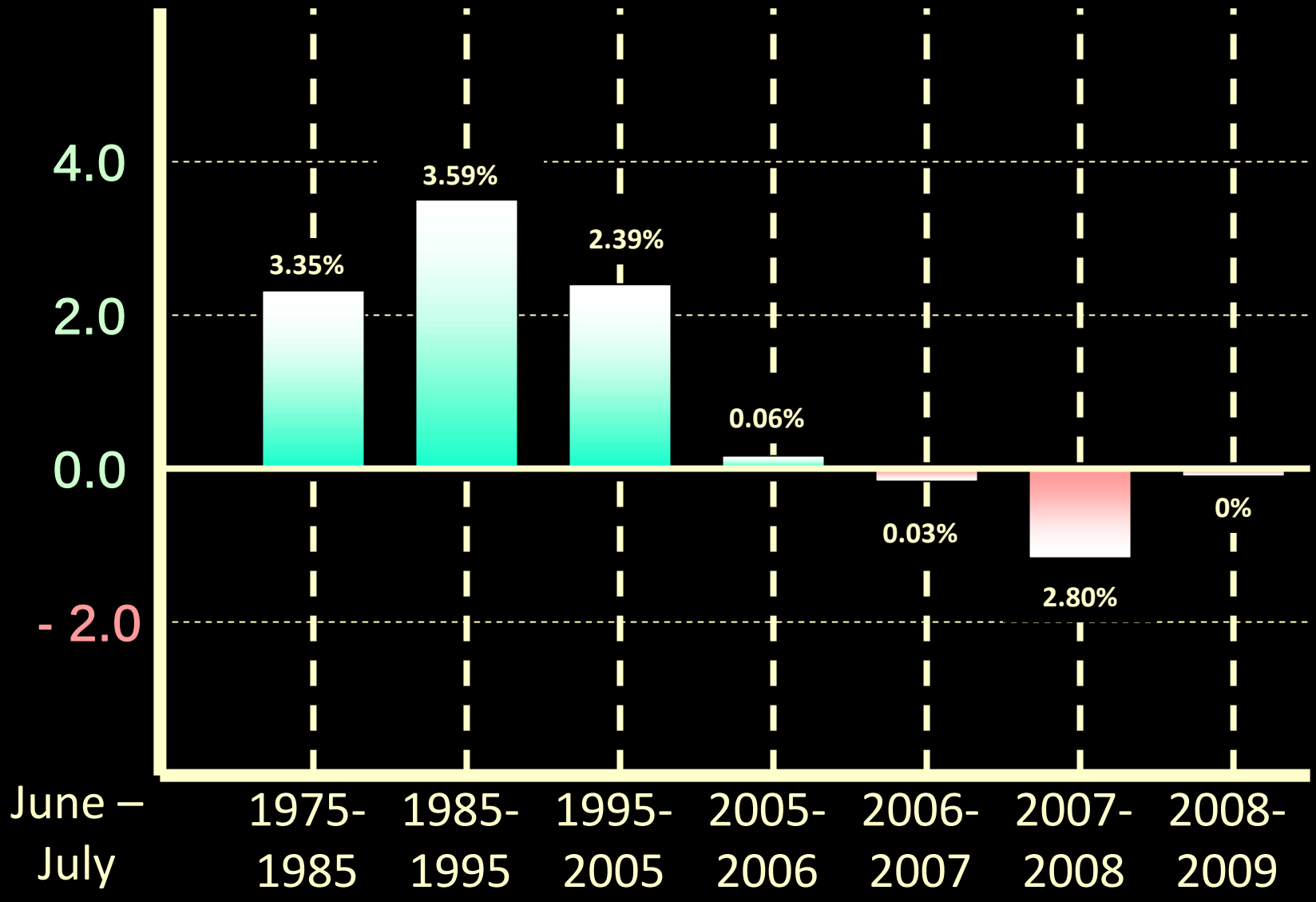
United States

Population & VMT

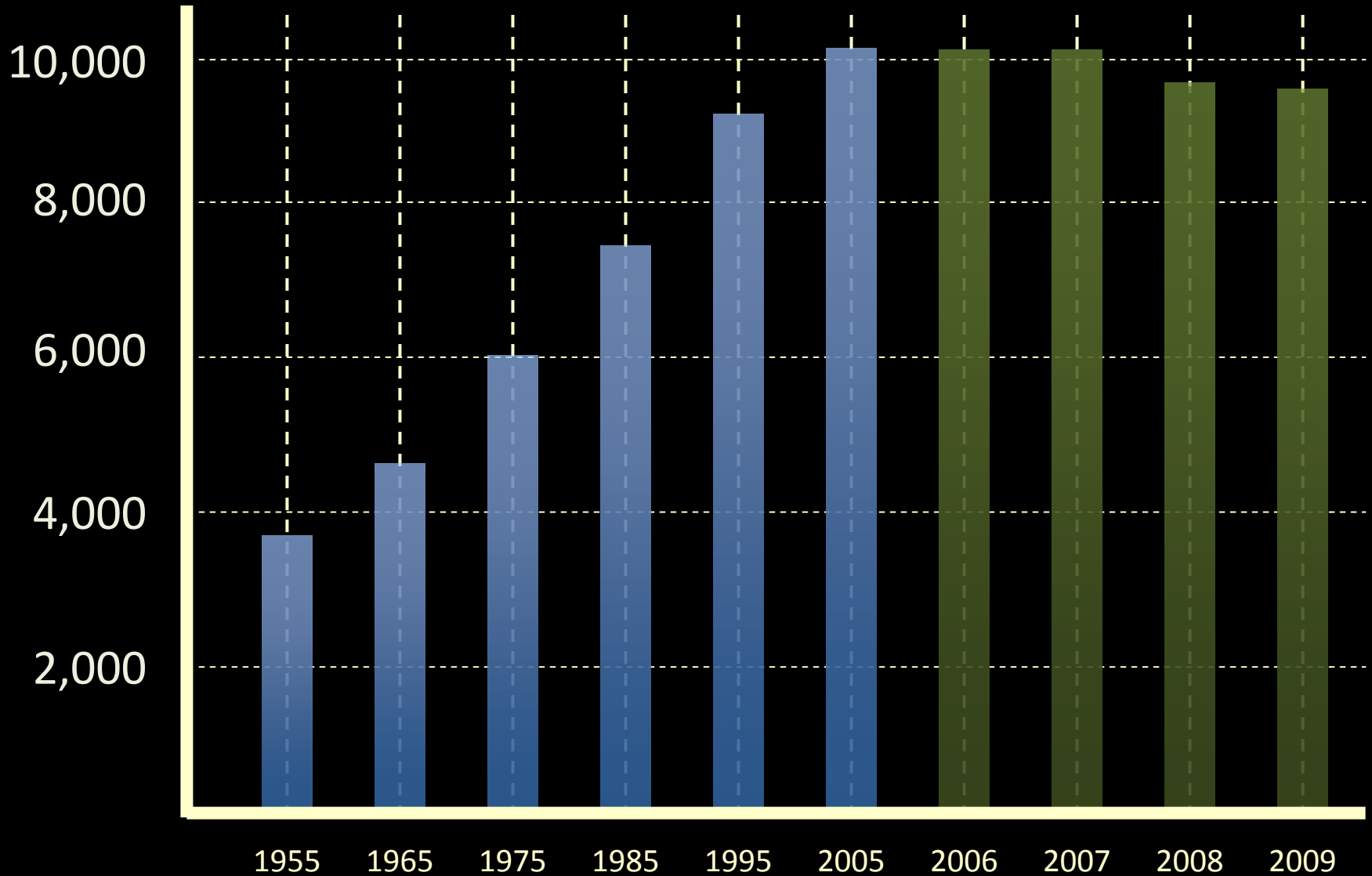


United States

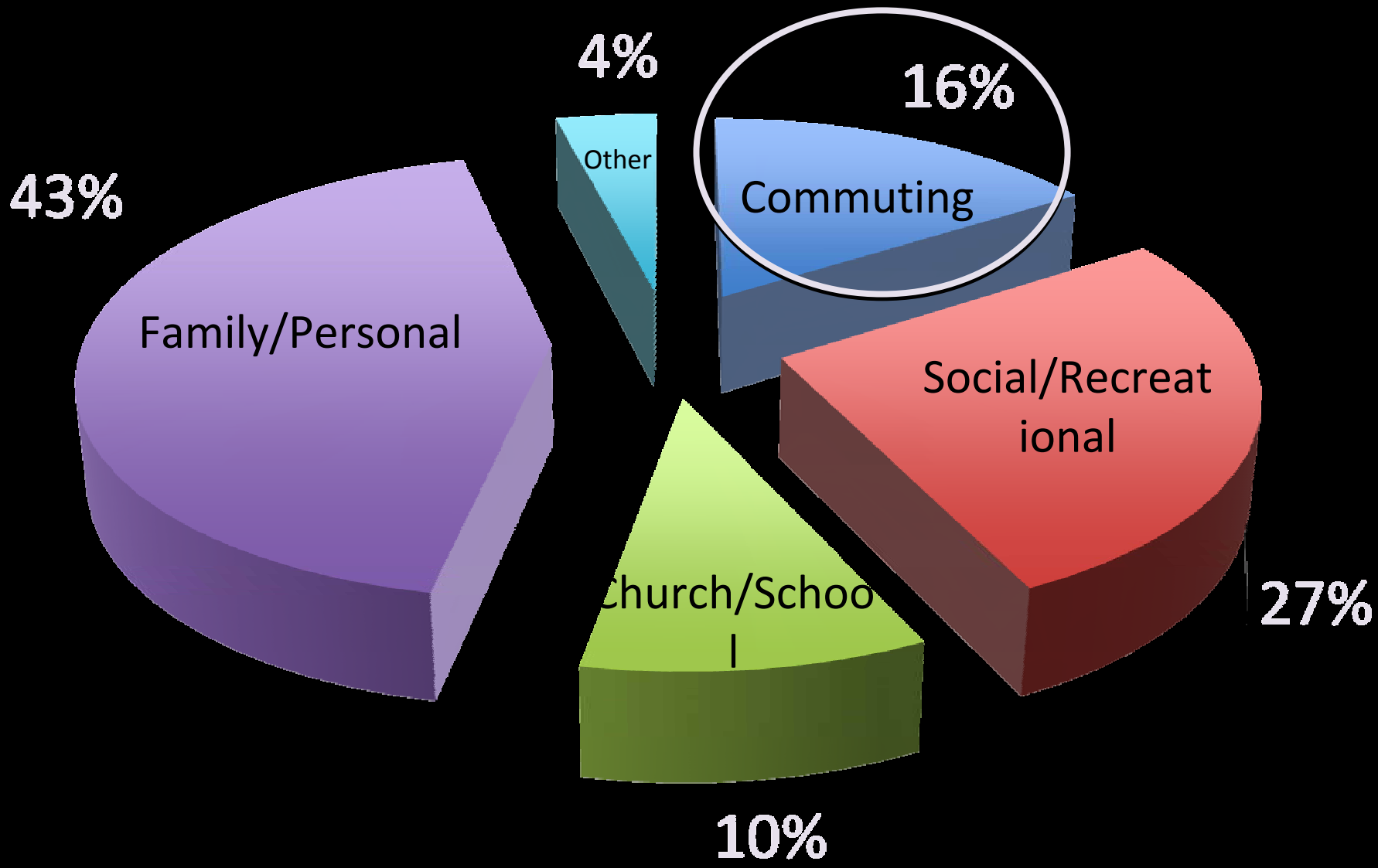
Annual Rate of Change in VMT



United States
VMT per Capita

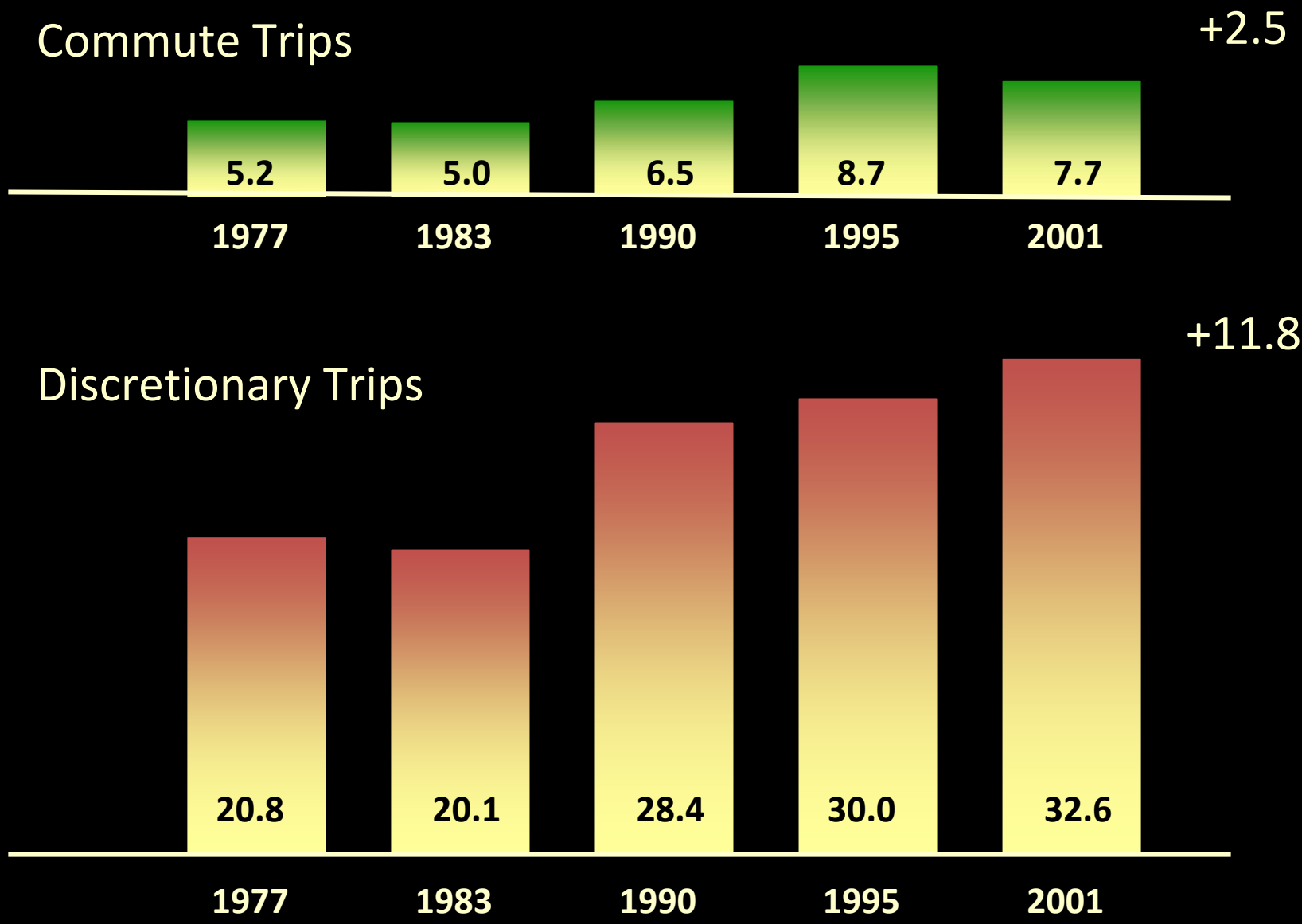


Daily Per Capita Travel



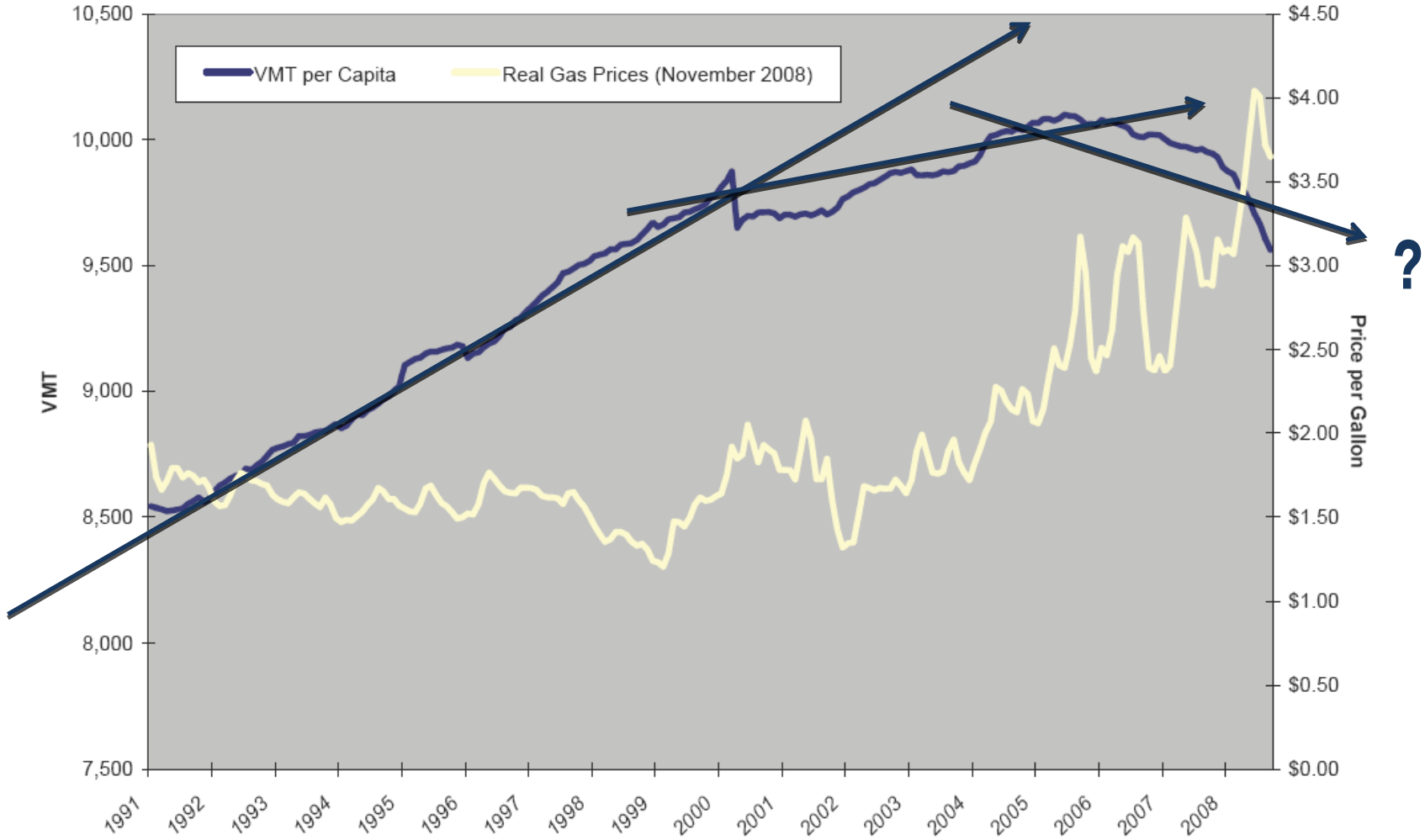
Source: 2001 NHTS

Daily Miles of Travel Per Capita



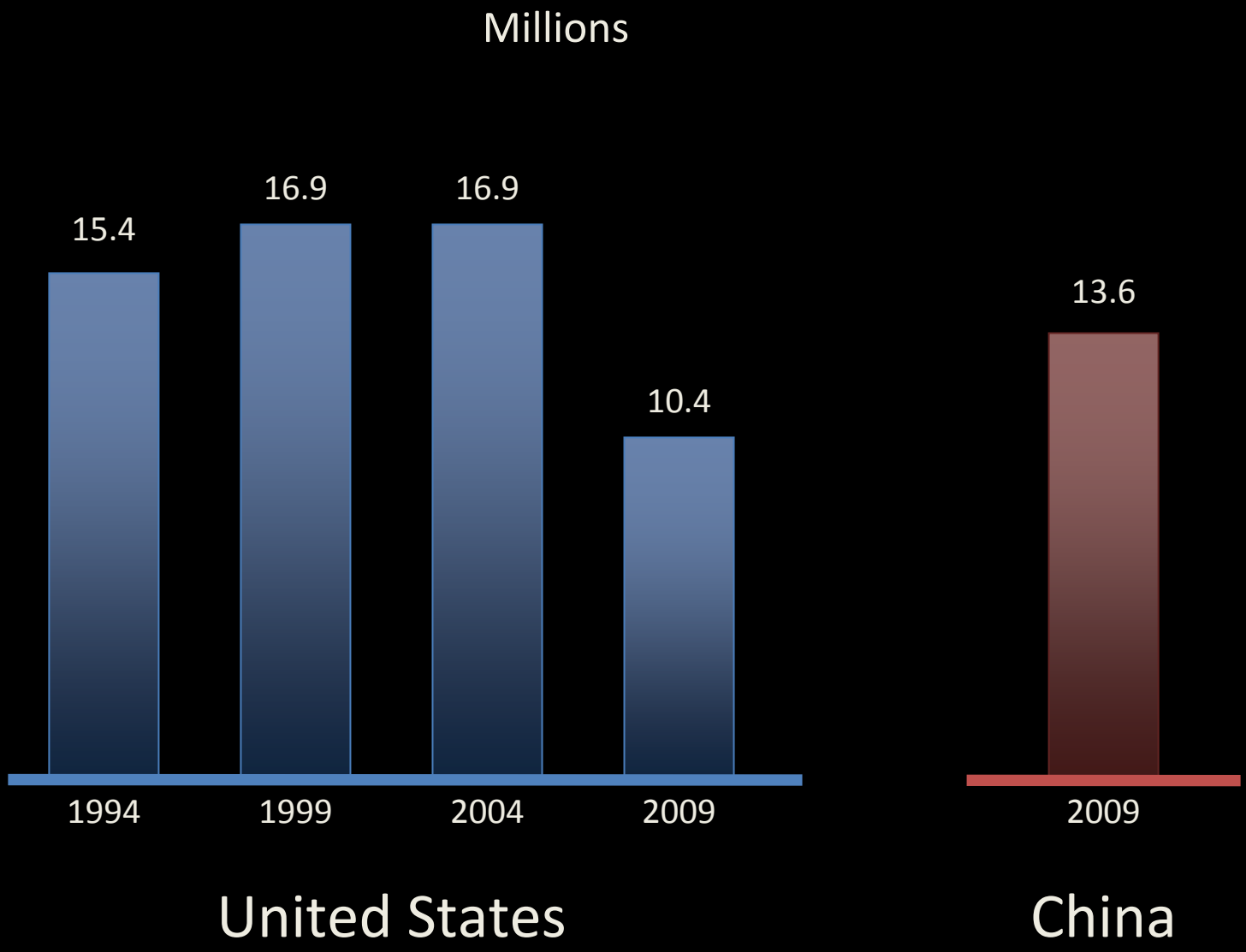
(NHTS)

**Figure 1b. U.S. Vehicle Miles Traveled Per Capita, Annualized and Real Gasoline Pump Prices,
January 1991–September 2008**



Source: Traffic Volume Trends and Energy Information Administration

Annual Sales: New Motor Vehicles



Source: Bureau of Transportation Statistics

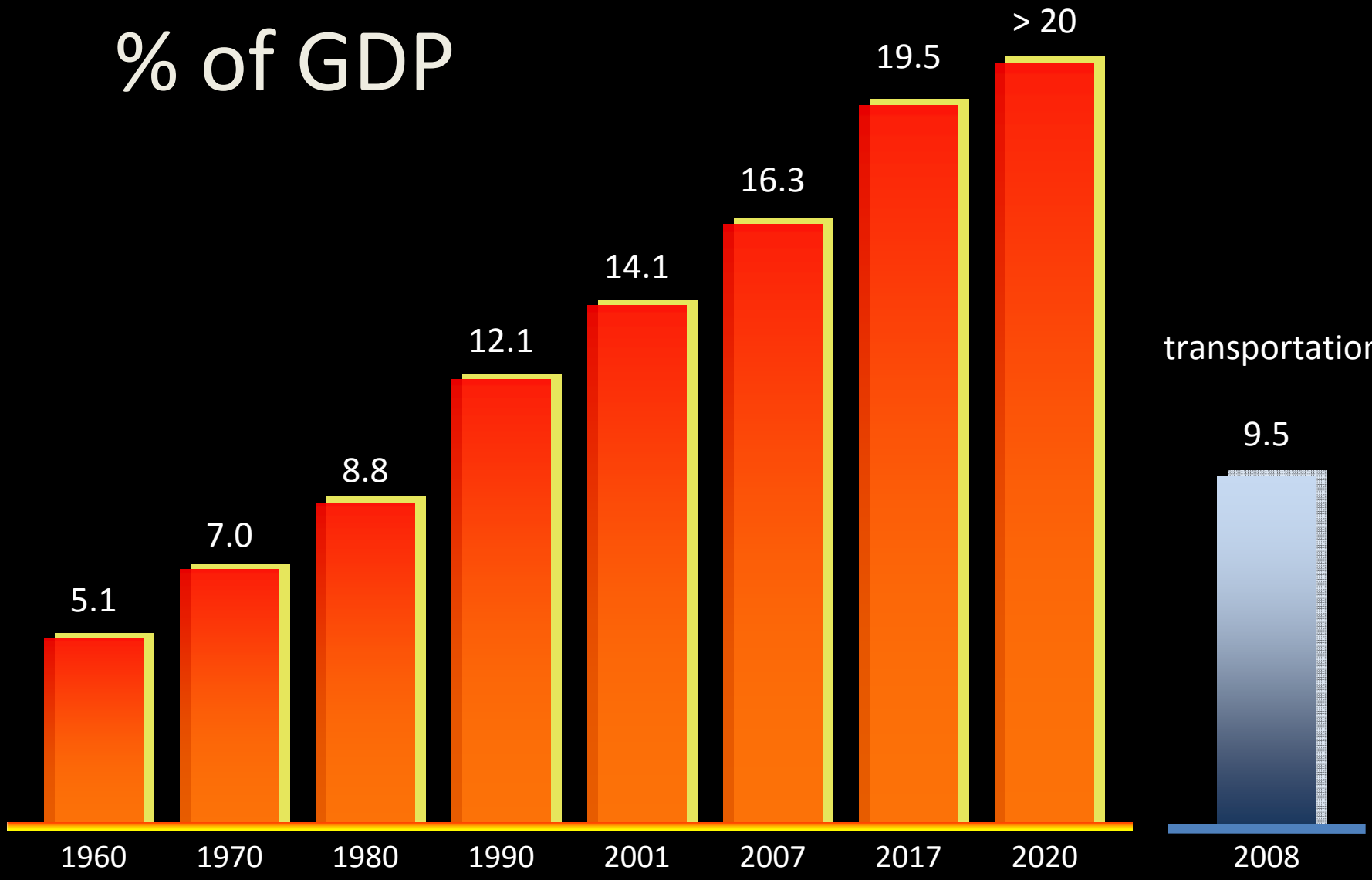
BOTTOM LINE:

We are entering the Post Petroleum Era, ready or not.

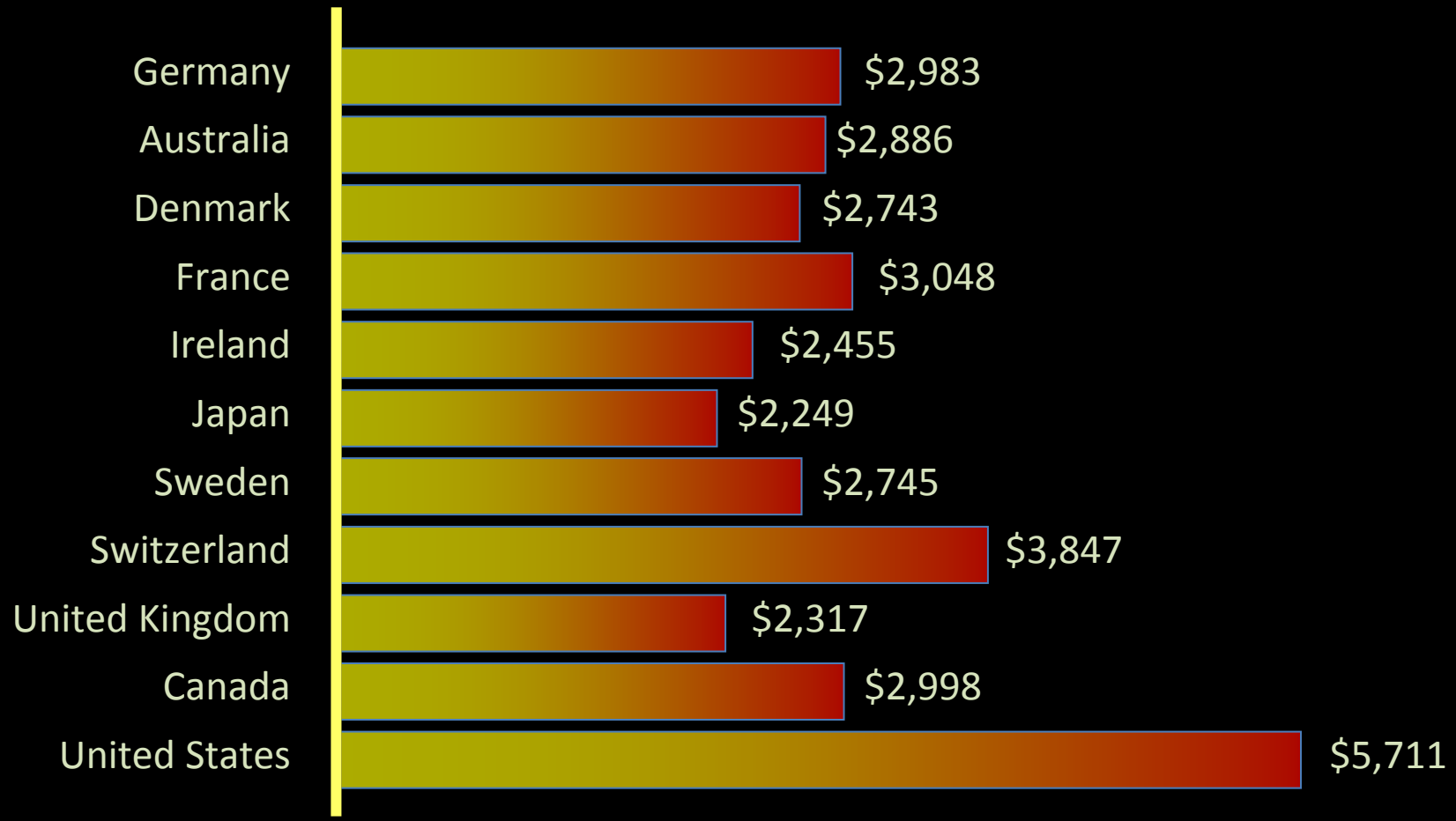
2

Public Health

US Health Care
% of GDP

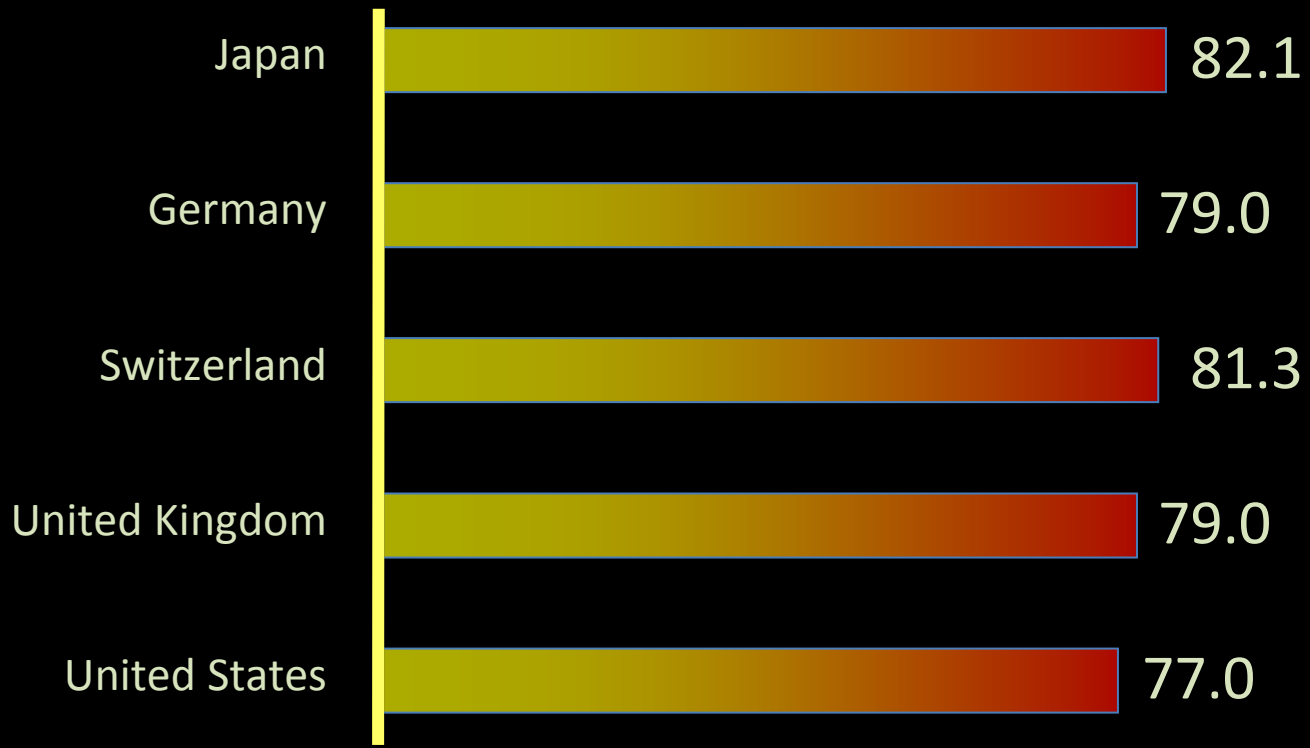


Annual Health Care Costs/Capita



Source: Kaiser Family Foundation, Visual Economics, 2010

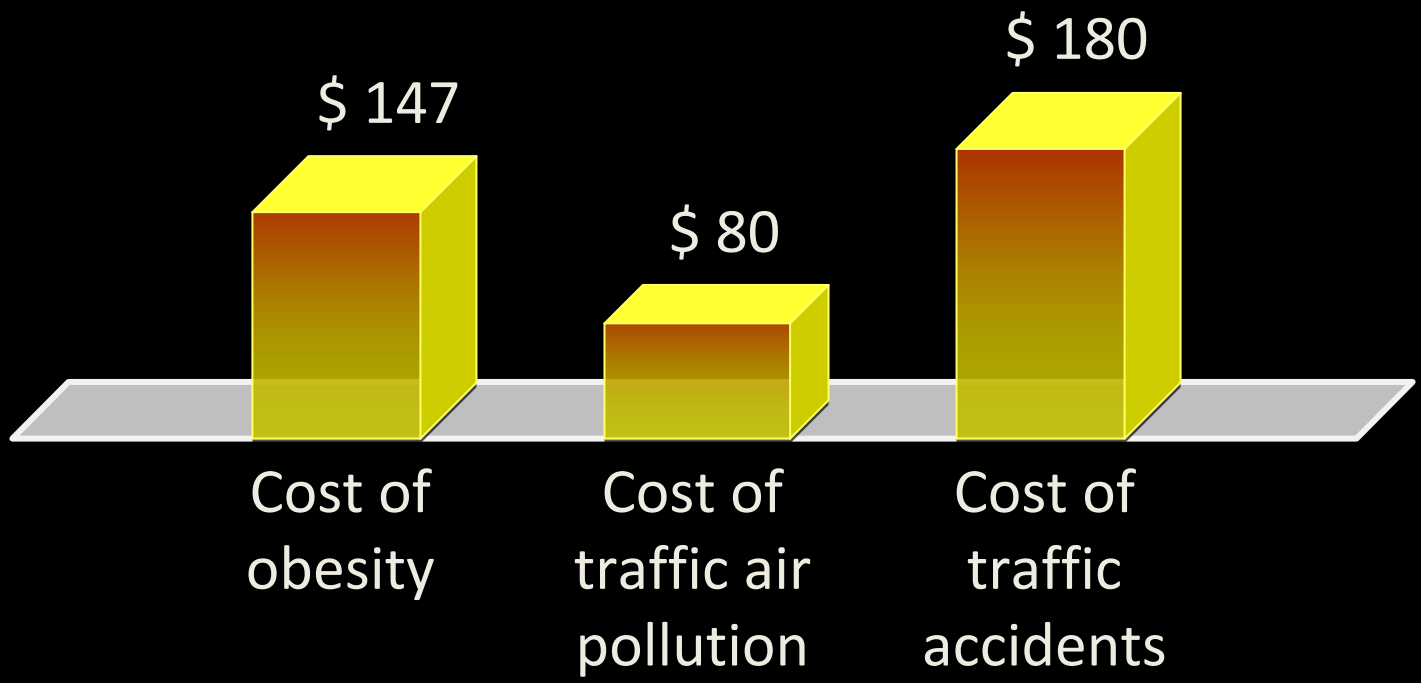
Average Life Expectancy



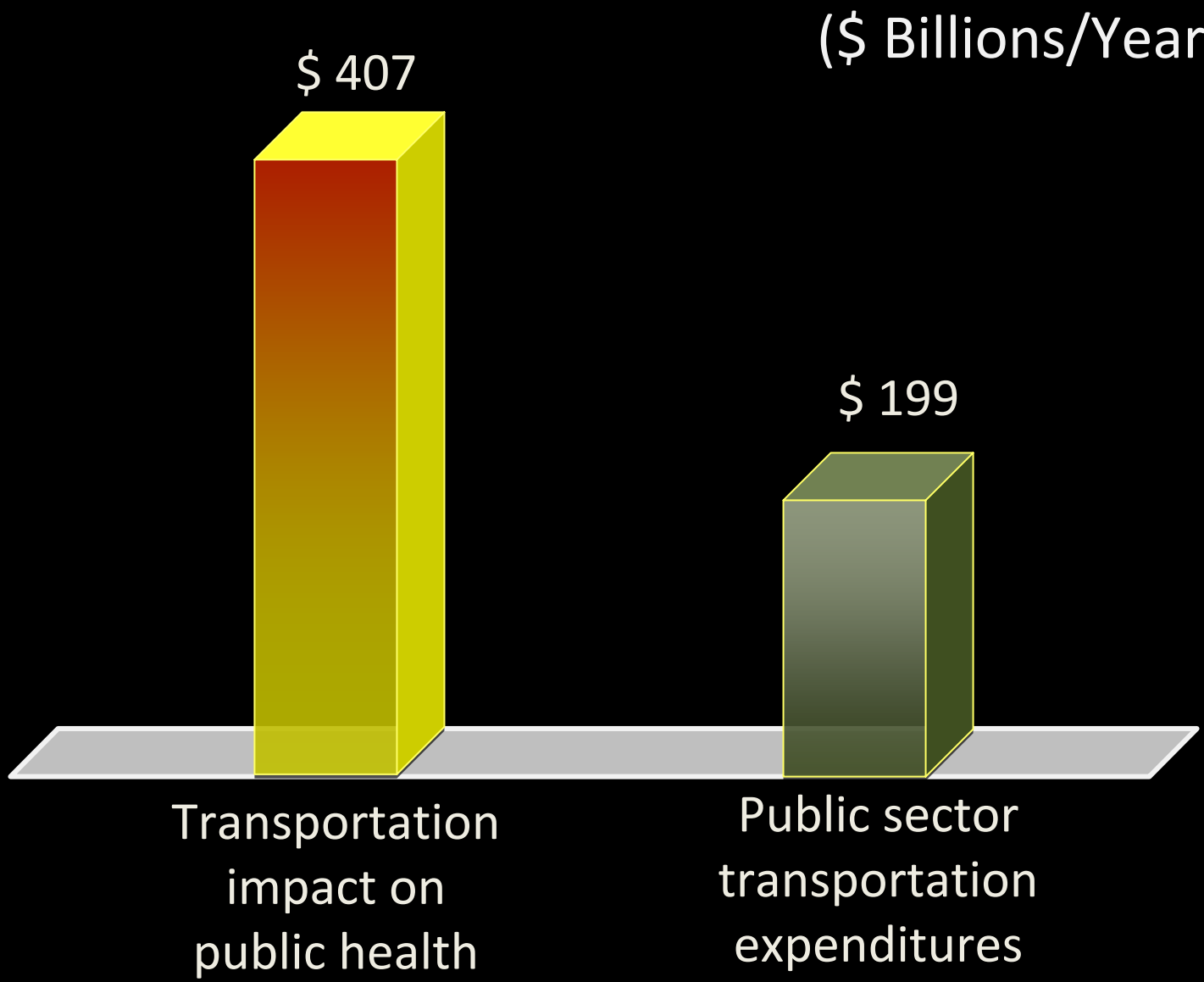
Source: Kaiser Family Foundation, Visual Economics, 2010

Scale – United States Economy

($ Billions/Year)



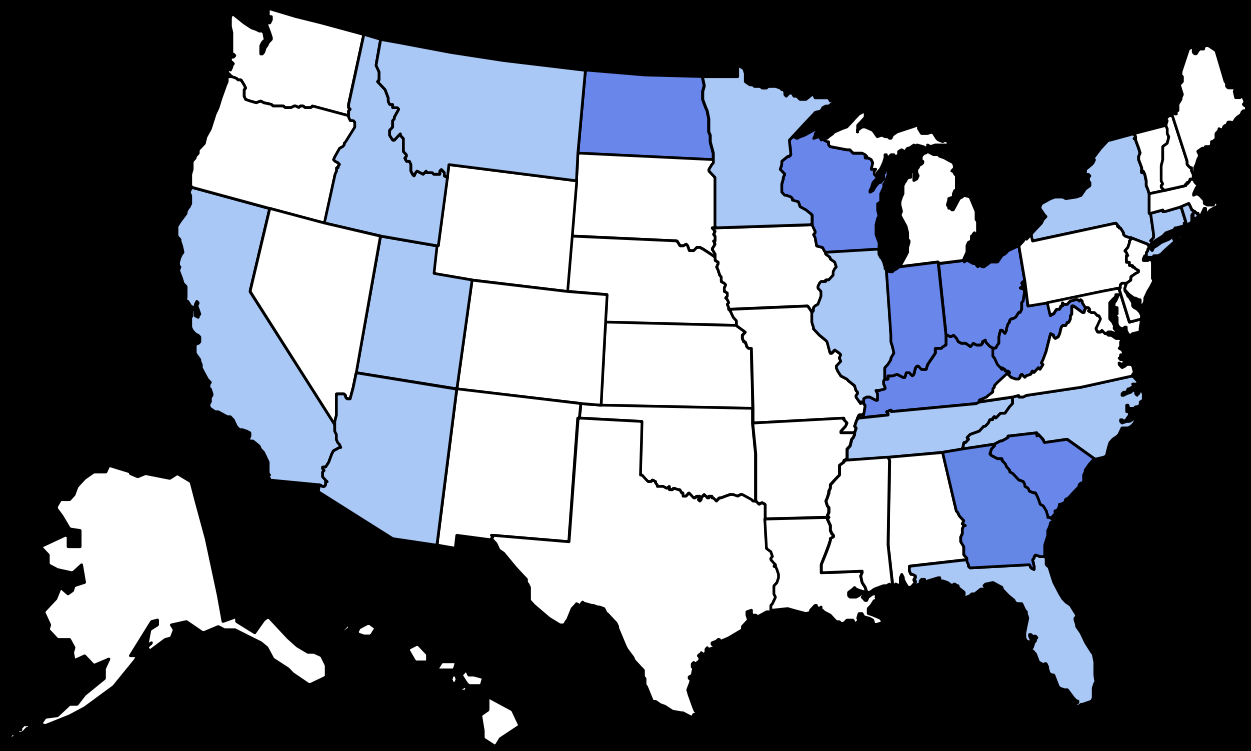
Scale – United States Economy



Obesity

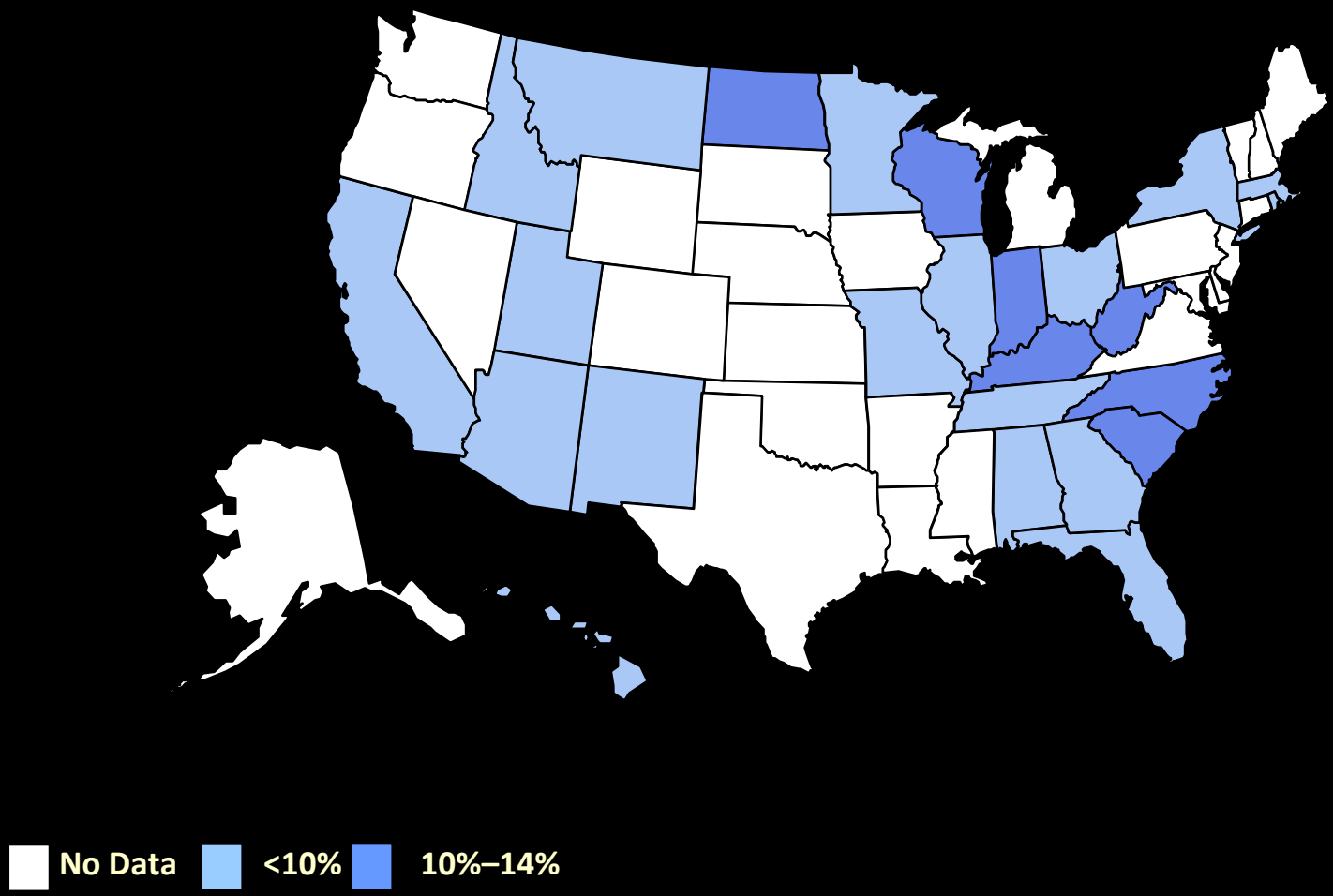
1985

Obesity Trends Among U.S. Adults

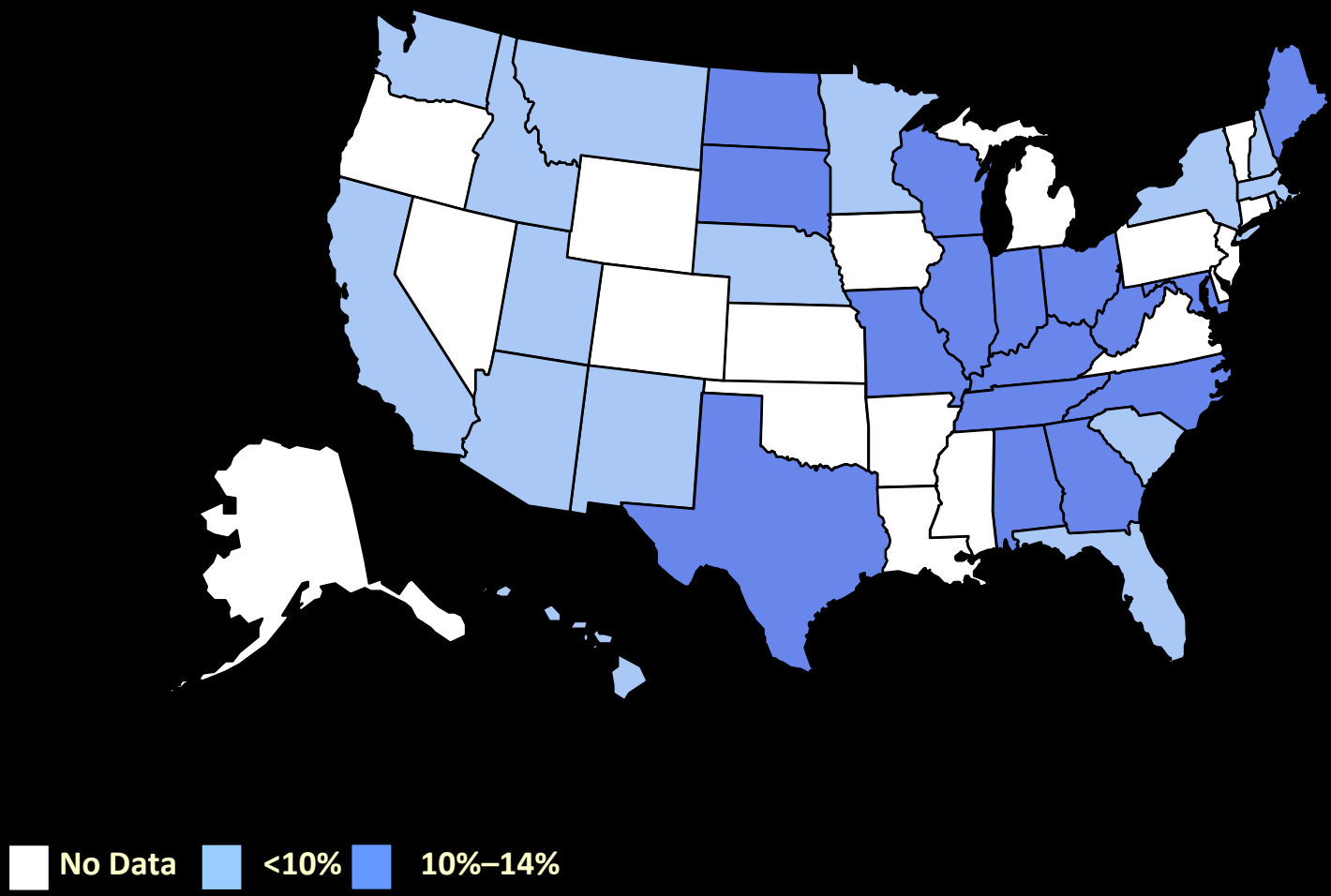


No Data <10% 10%–14%

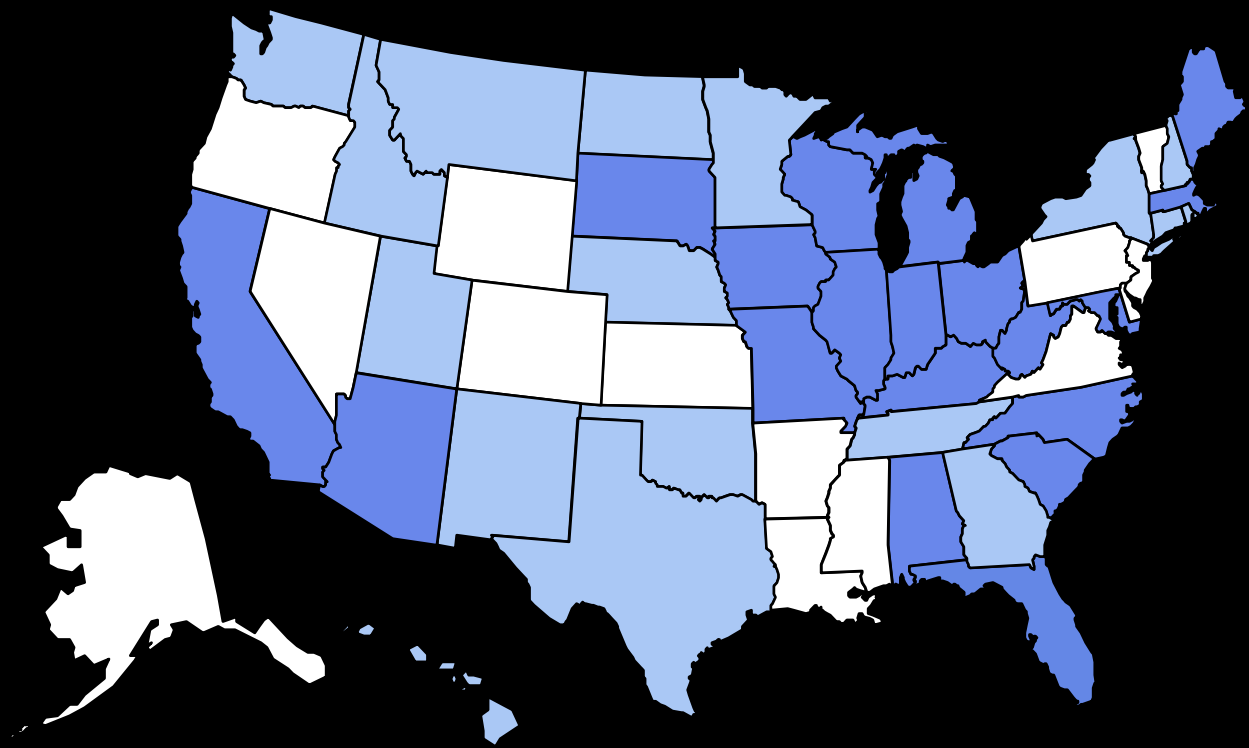
1986



1987

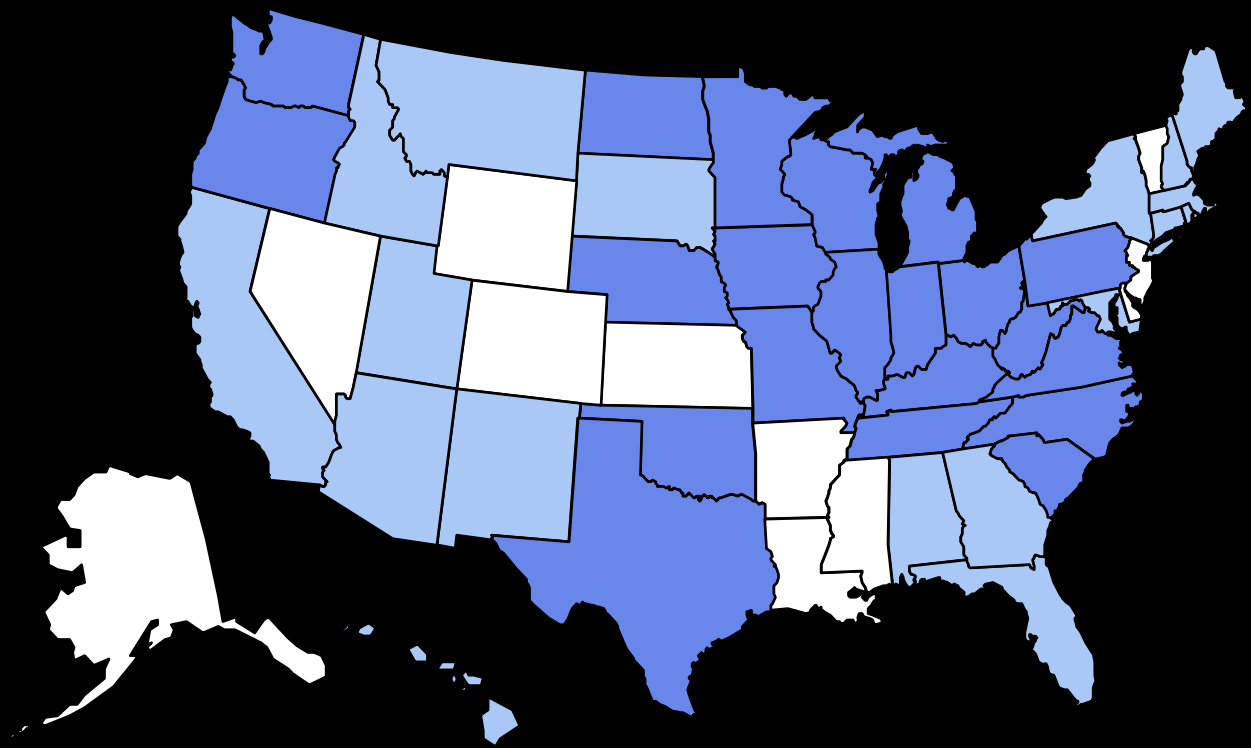


1988



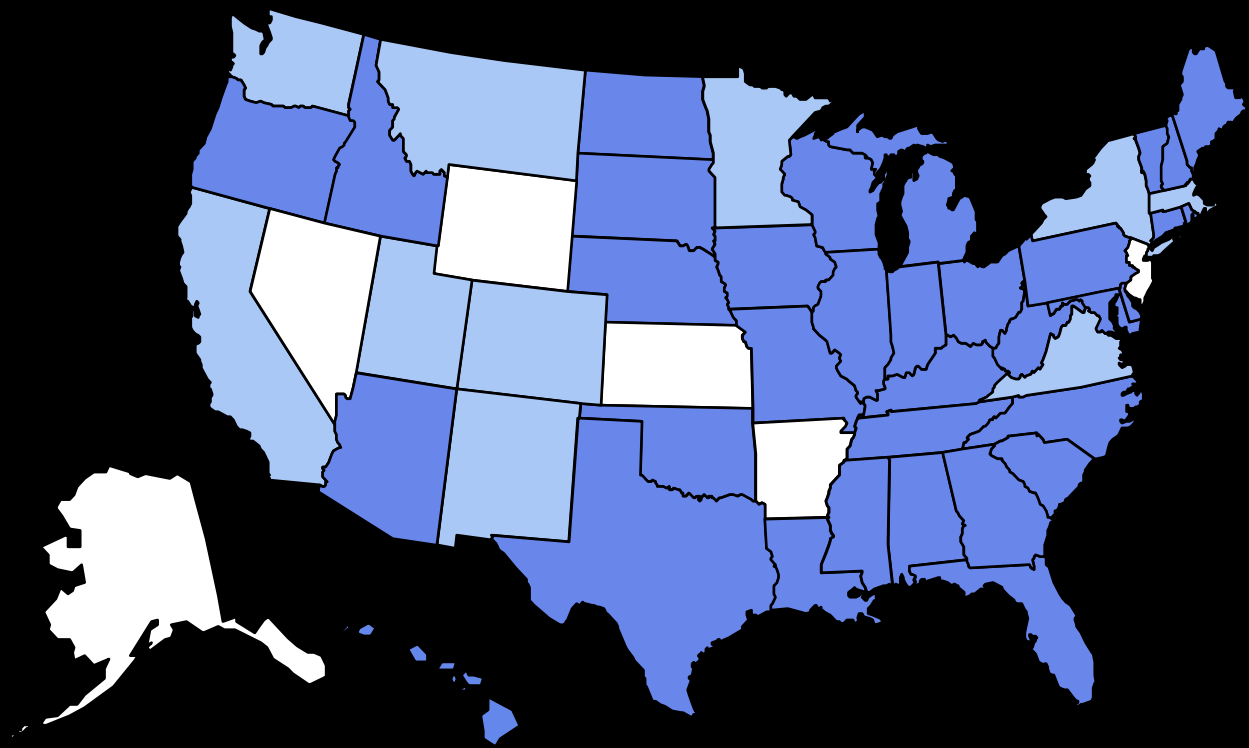
No Data <10% 10%–14%

1989



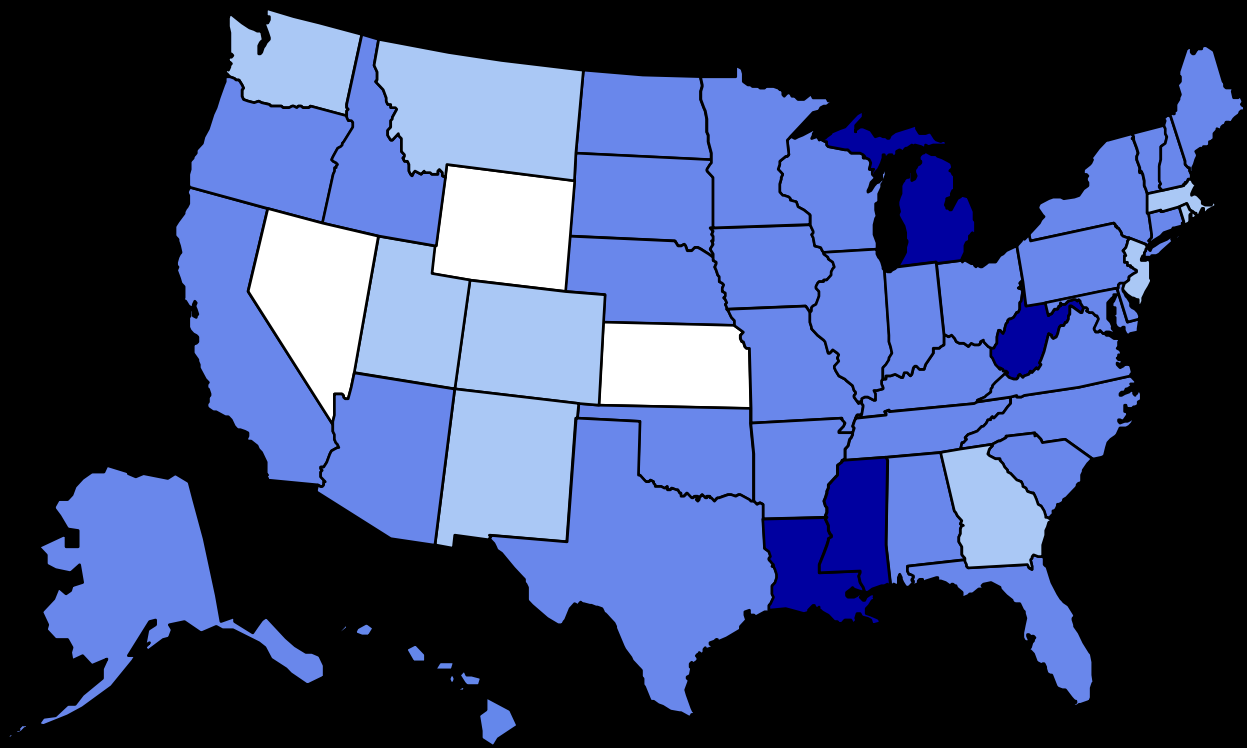
No Data <10% 10%–14%

1990



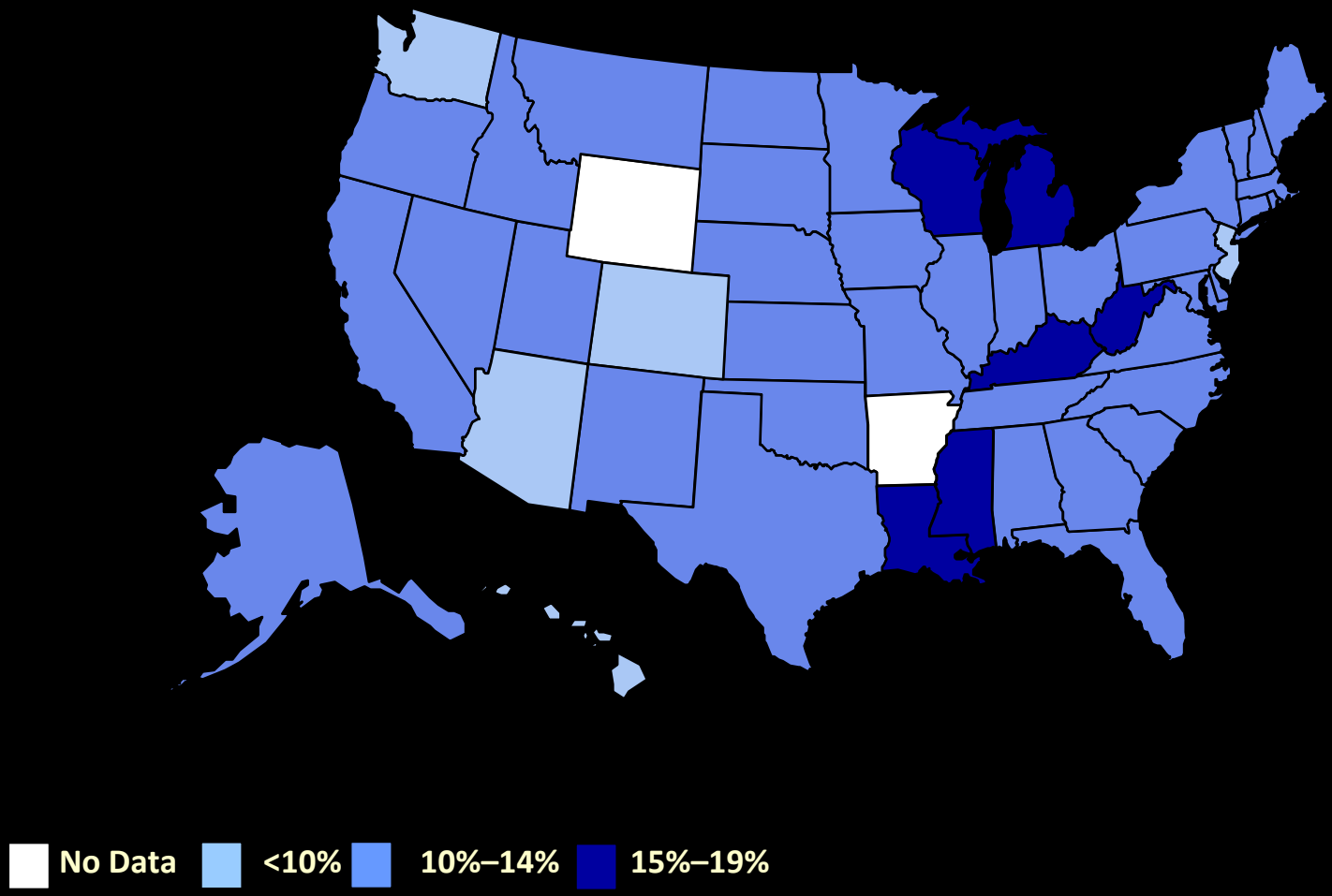
No Data <10% 10%–14%

1991

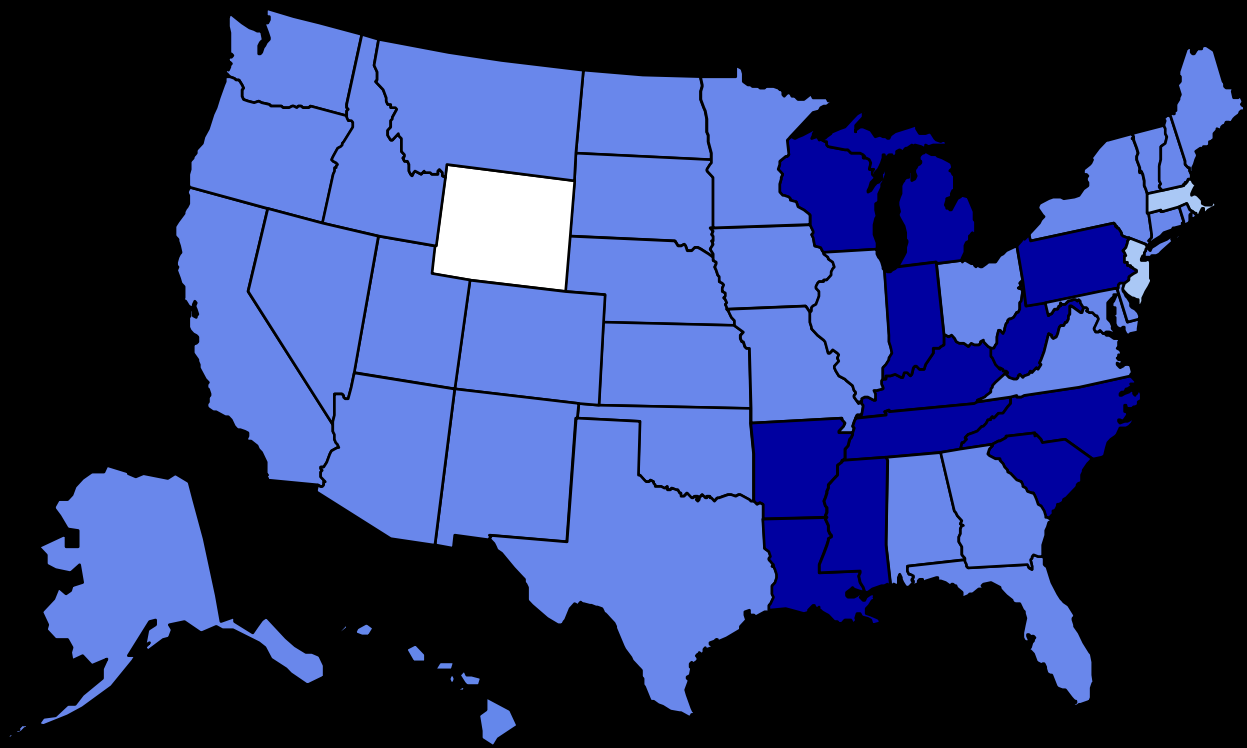


No Data <10% 10%–14% 15%–19%

1992

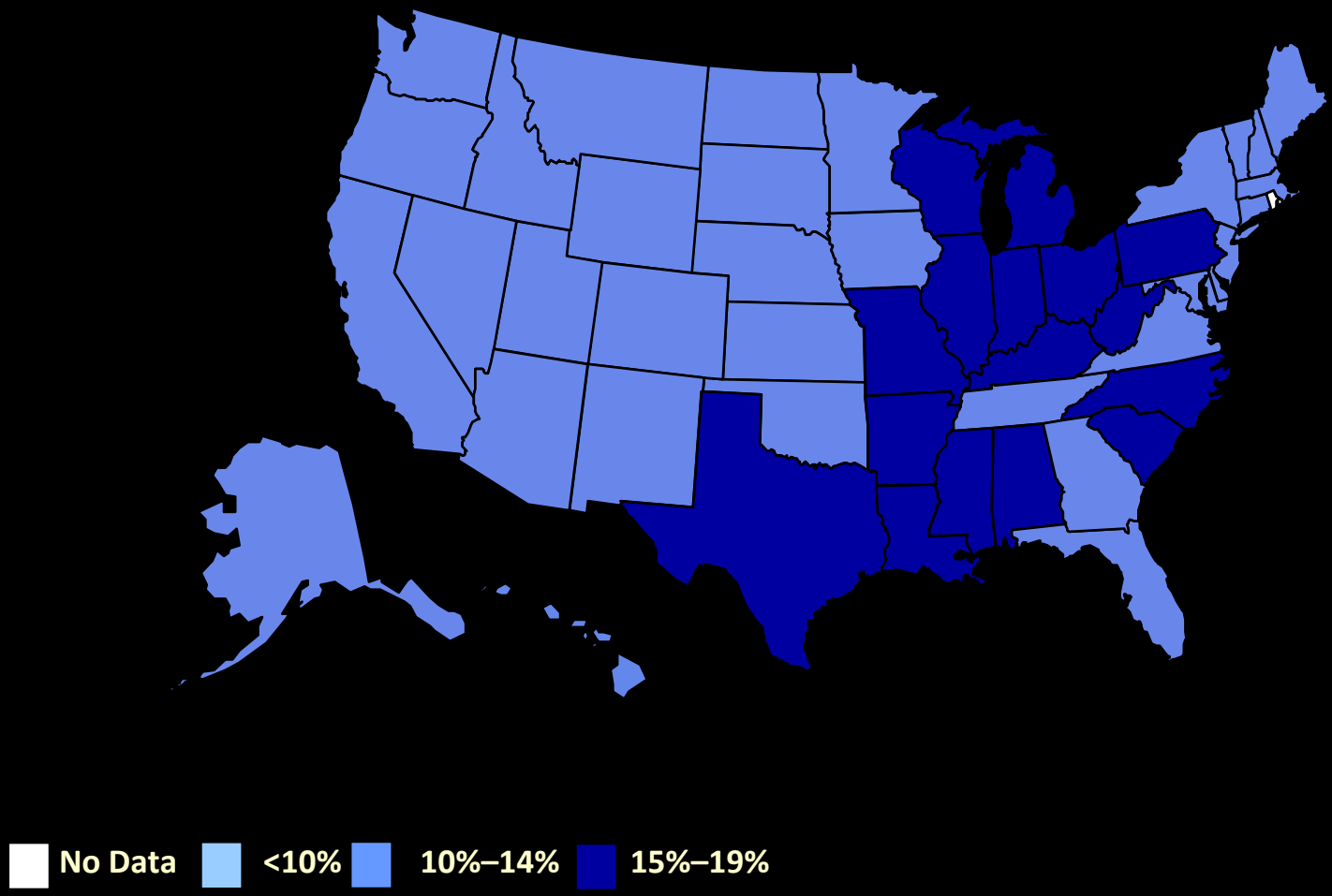


1993

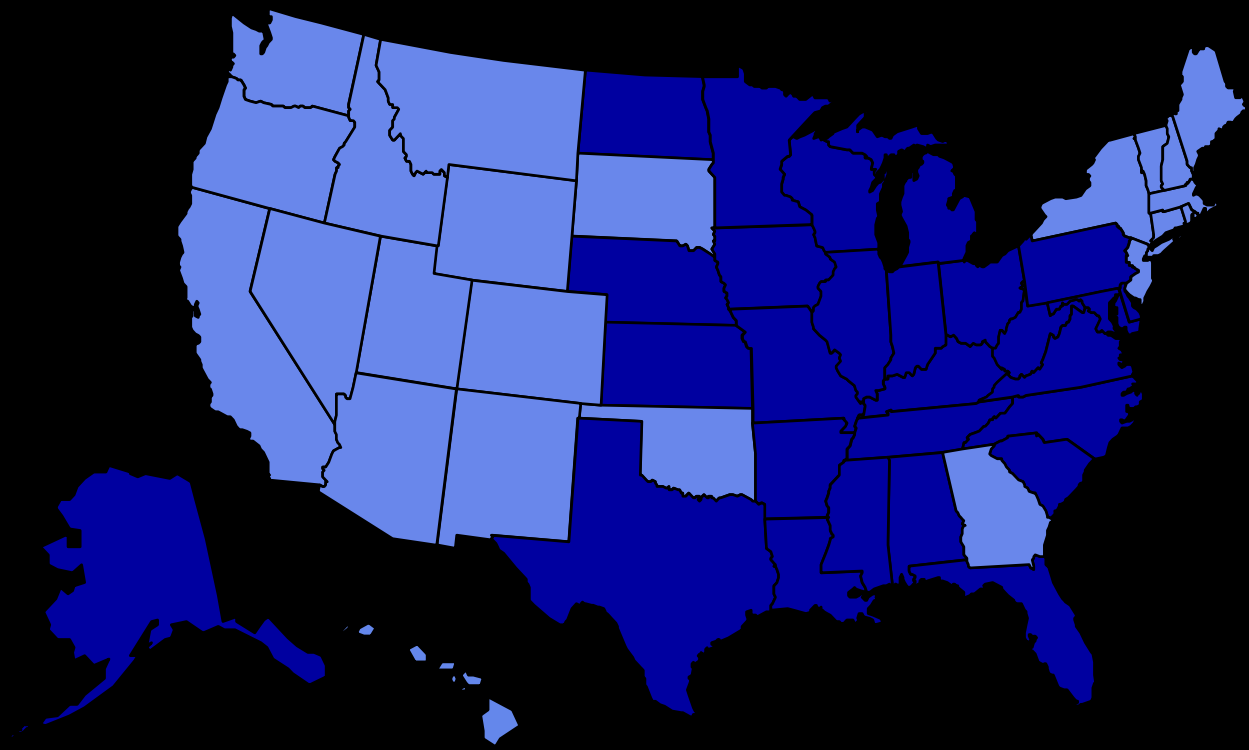


No Data | <10% | 10%–14% | 15%–19%

1994

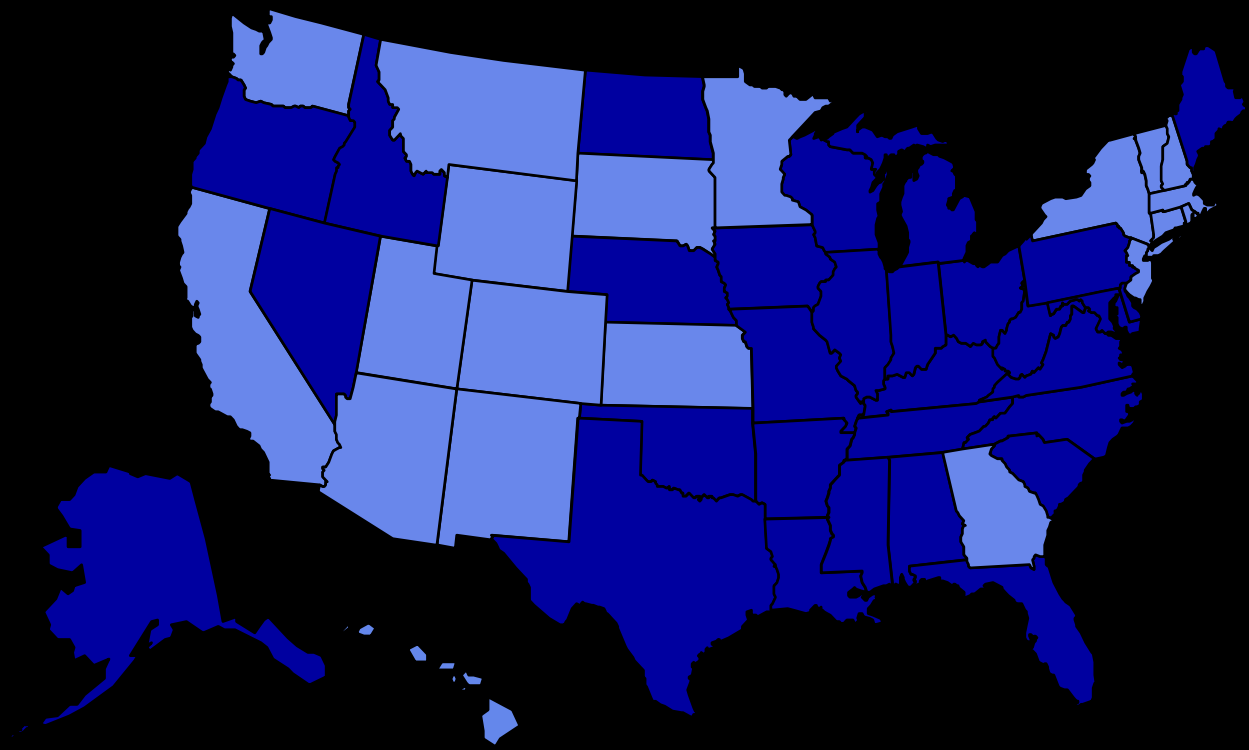


1995



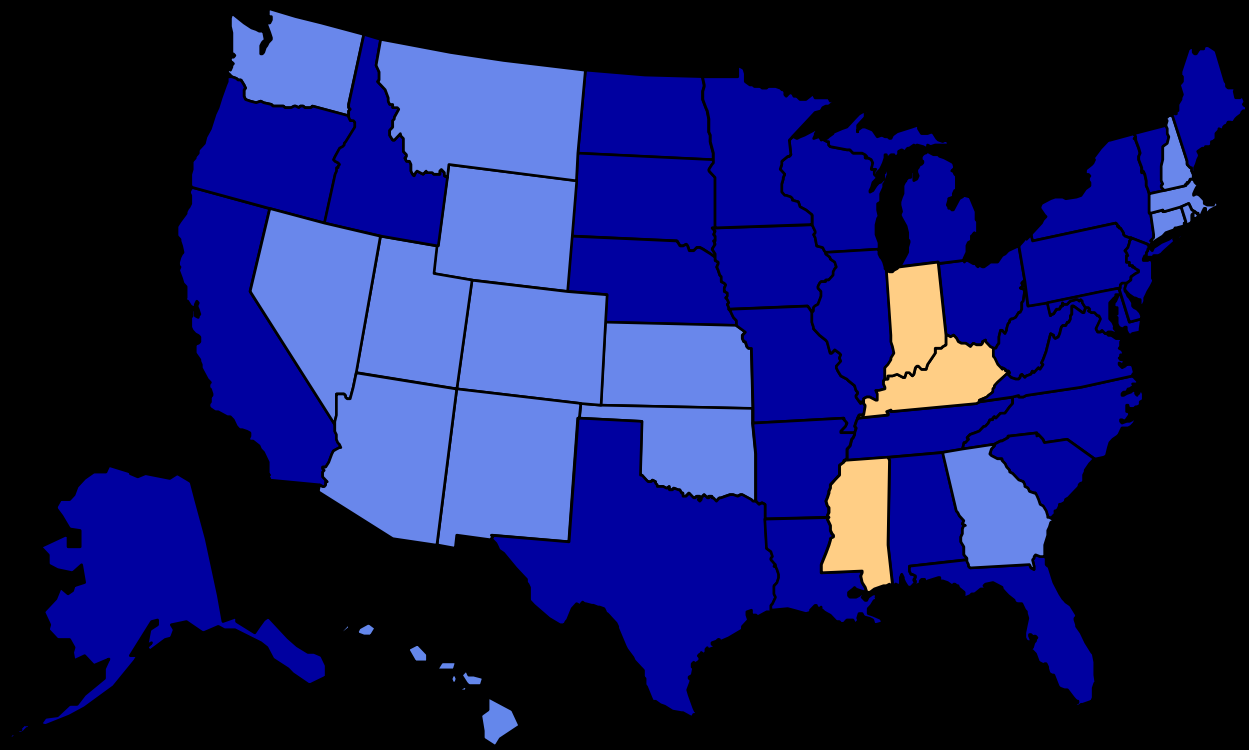
No Data | <10% | 10%–14% | 15%–19%

1996



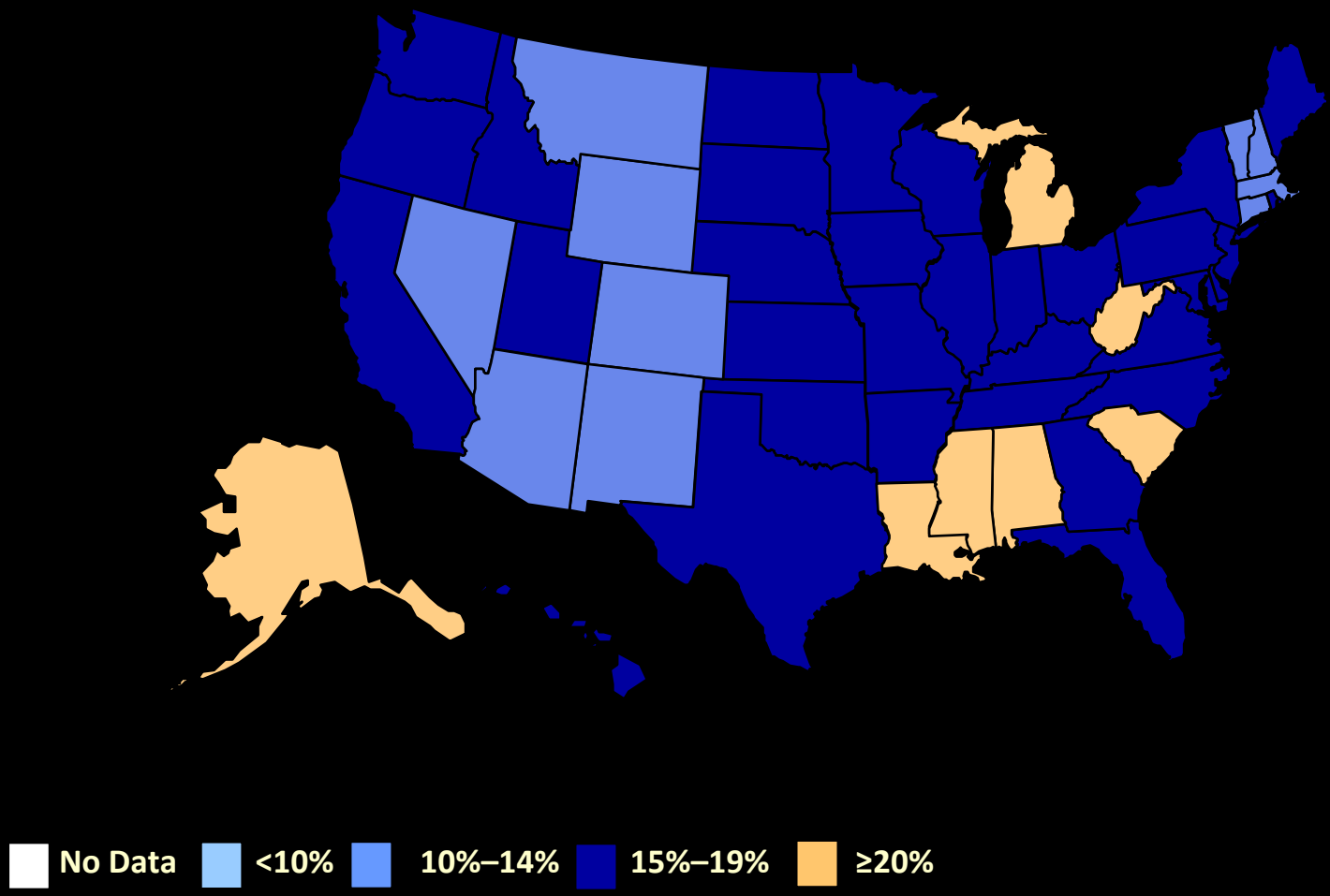
No Data <10% 10%–14% 15%–19%

1997

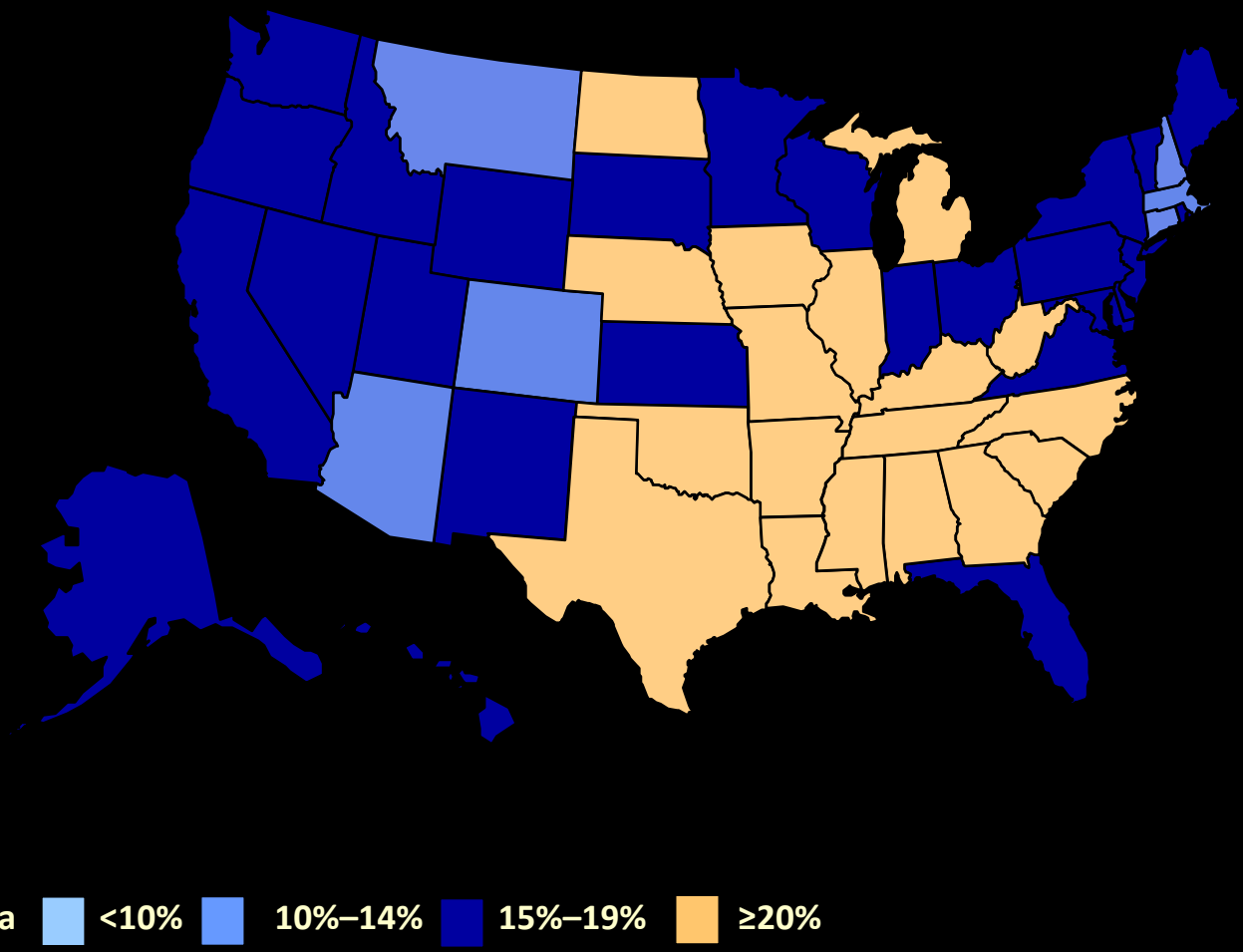


No Data | <10% | 10%–14% | 15%–19% | ≥20%

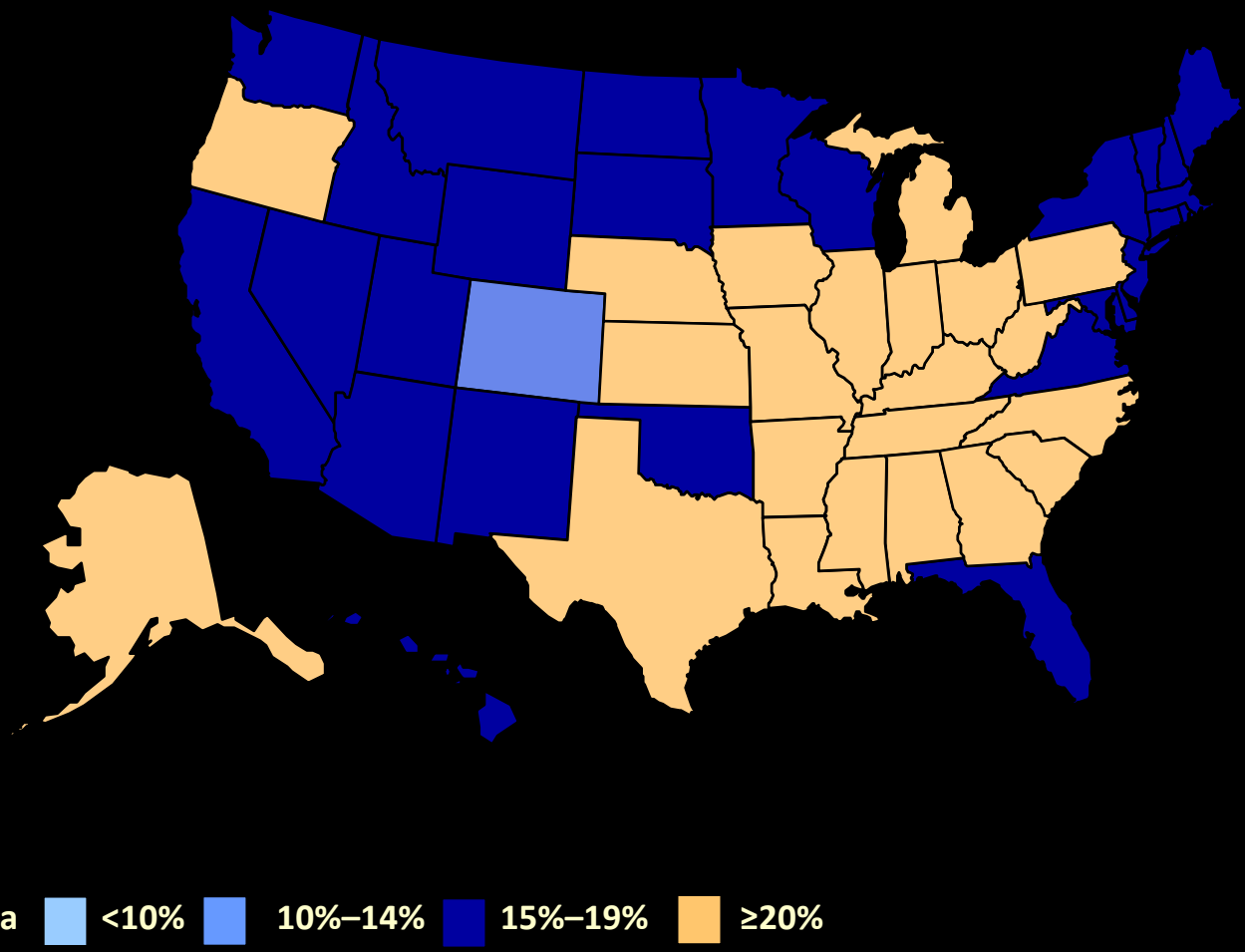
1998



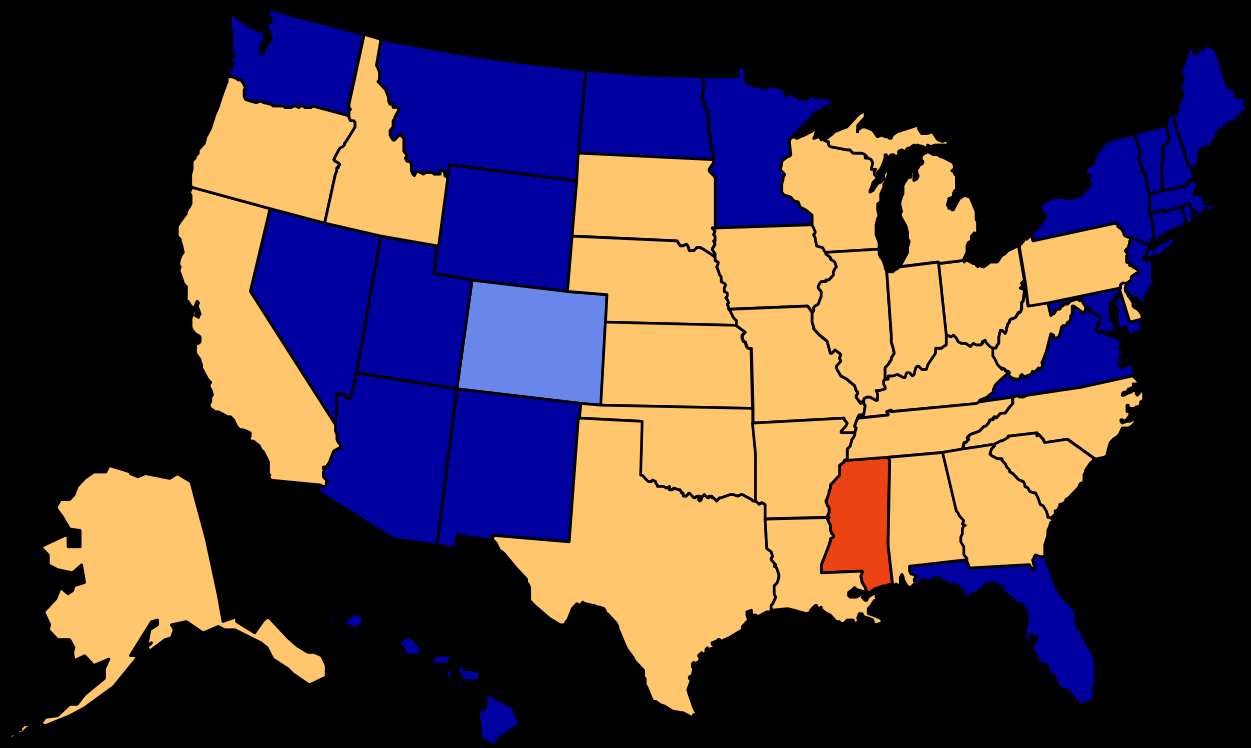
1999



2000

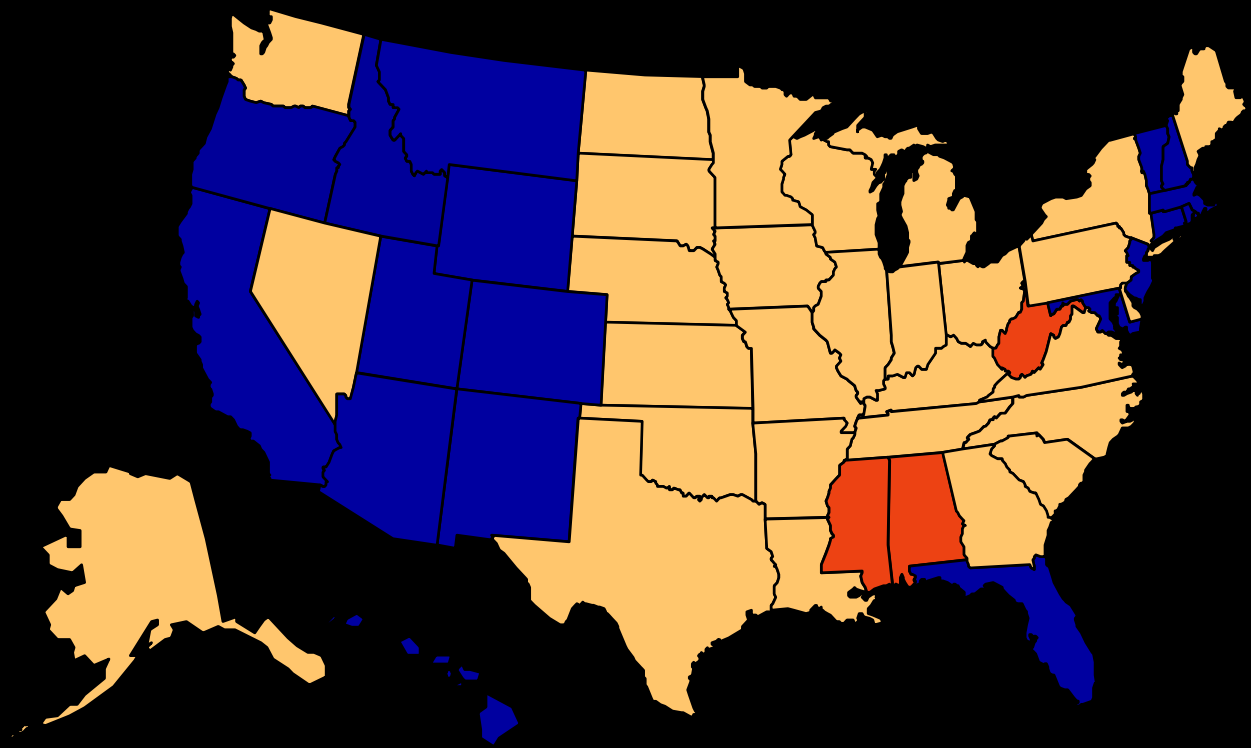


2001



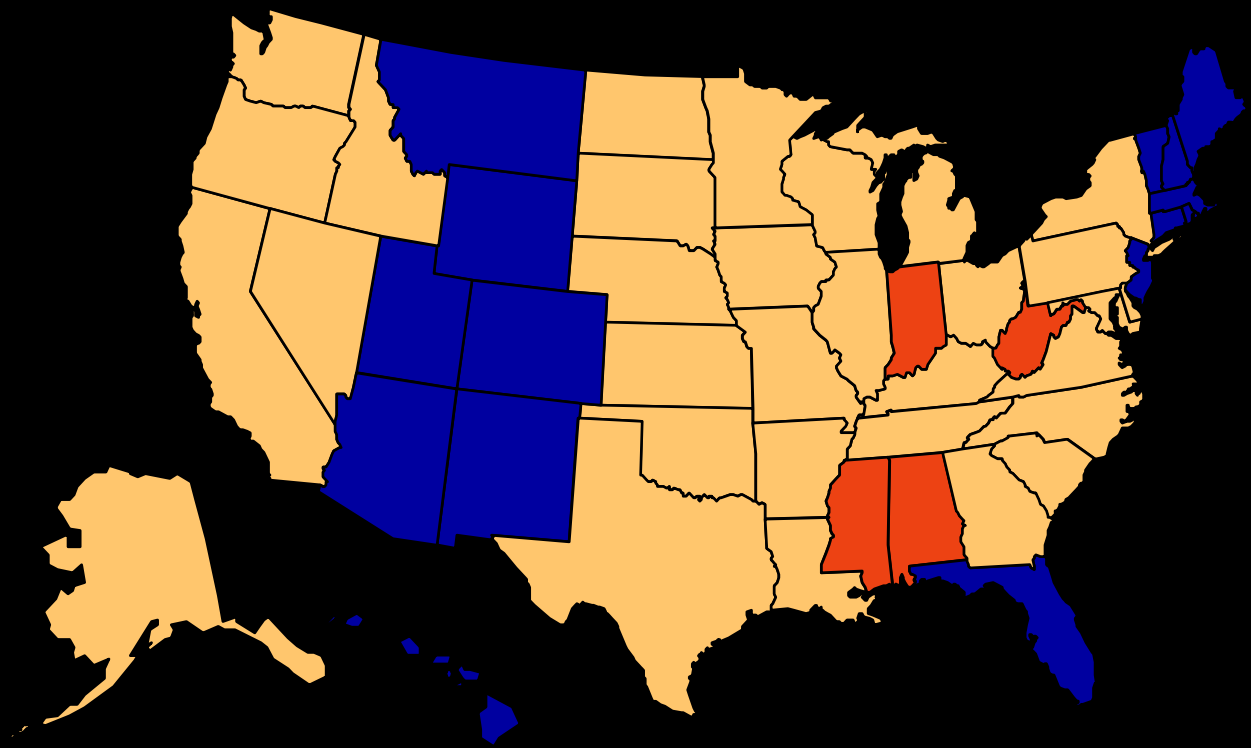
No Data | <10% | 10%–14% | 15%–19% | 20%–24% | ≥25%

2002



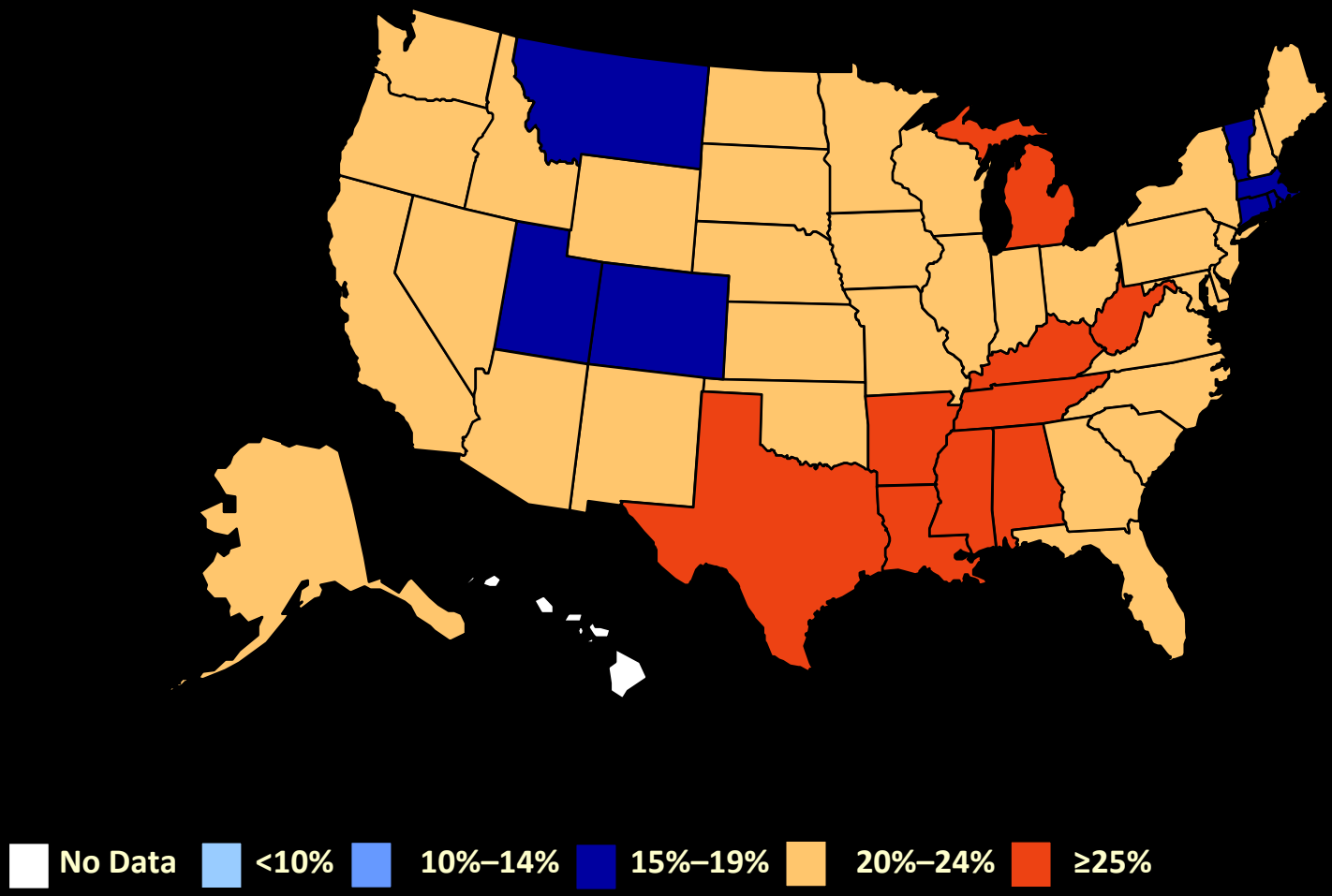
No Data | <10% | 10%–14% | 15%–19% | 20%–24% | ≥25%

2003

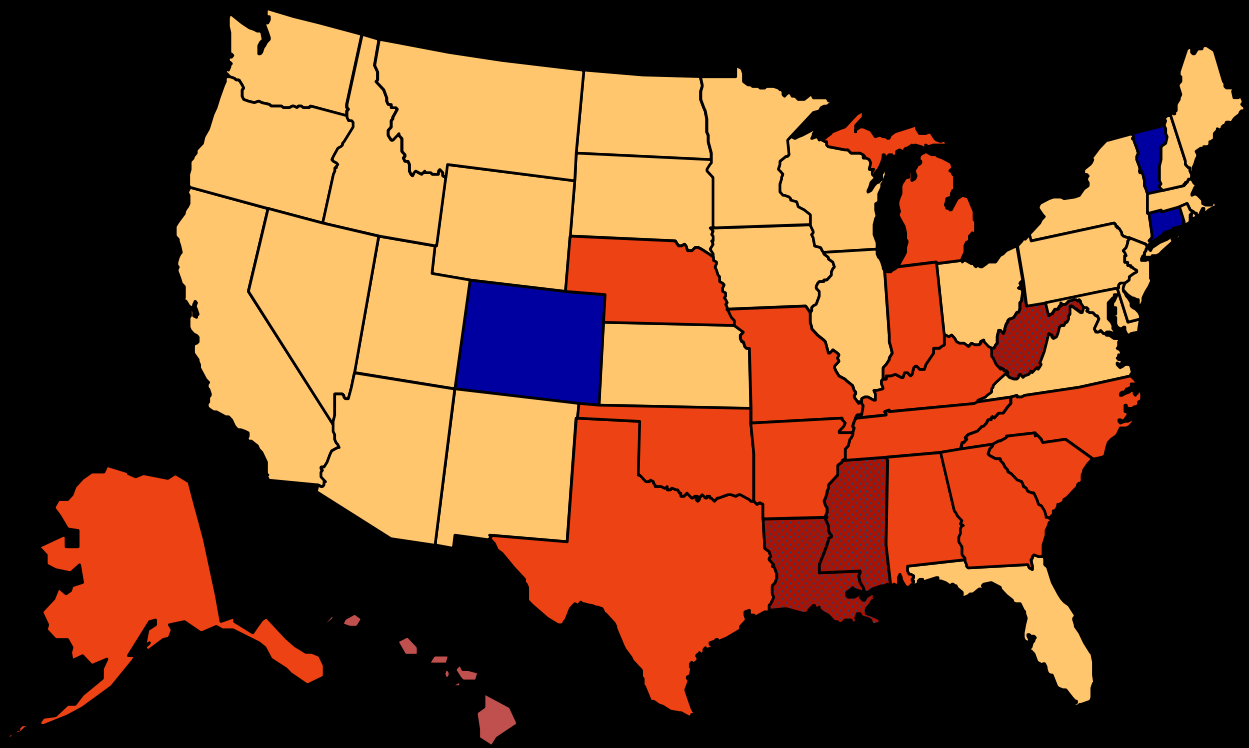


No Data | <10% | 10%–14% | 15%–19% | 20%–24% | ≥25%

2004

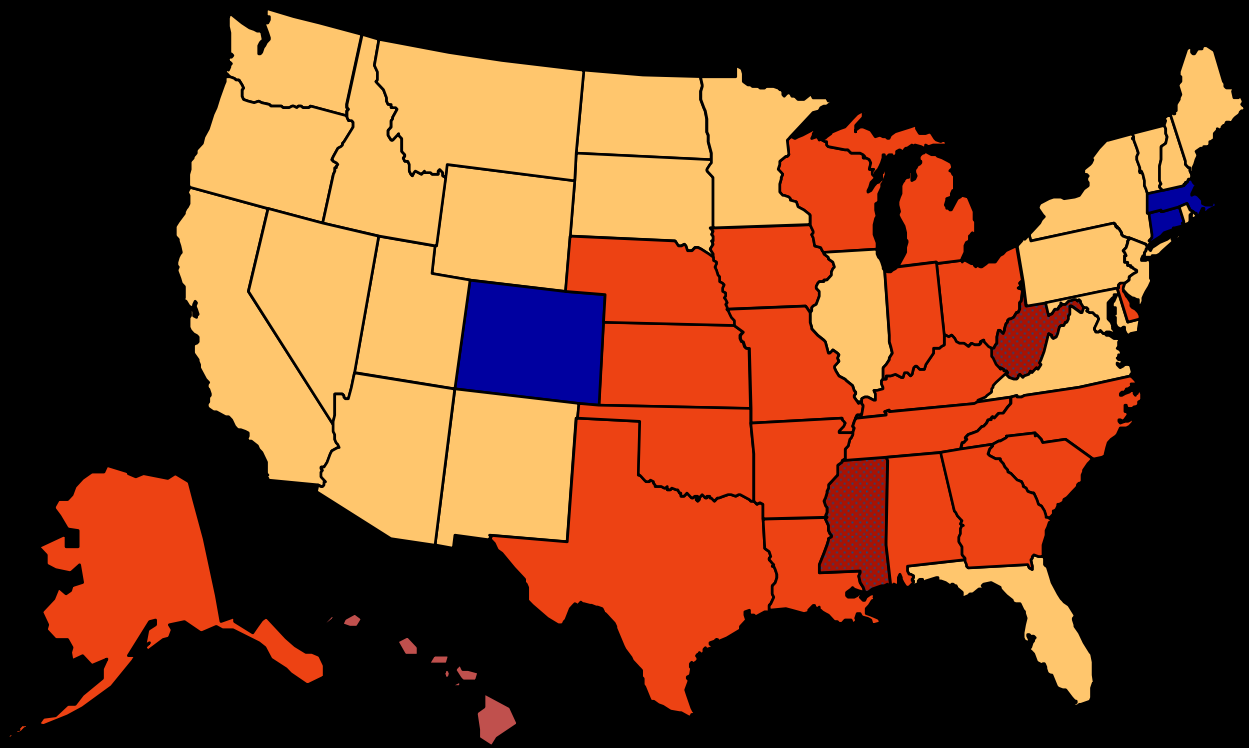


2005



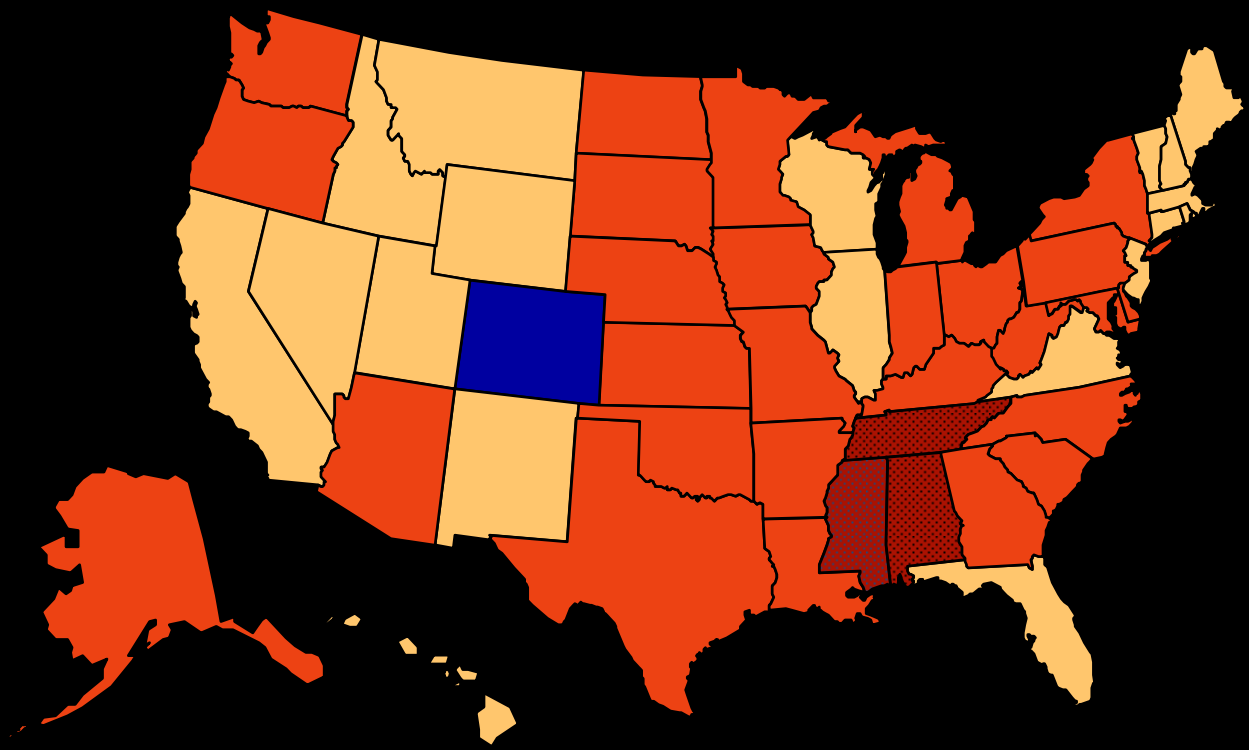
No Data | <10% | 10%–14% | 15%–19% | 20%–24% | 25%–29% | ≥30%

2006



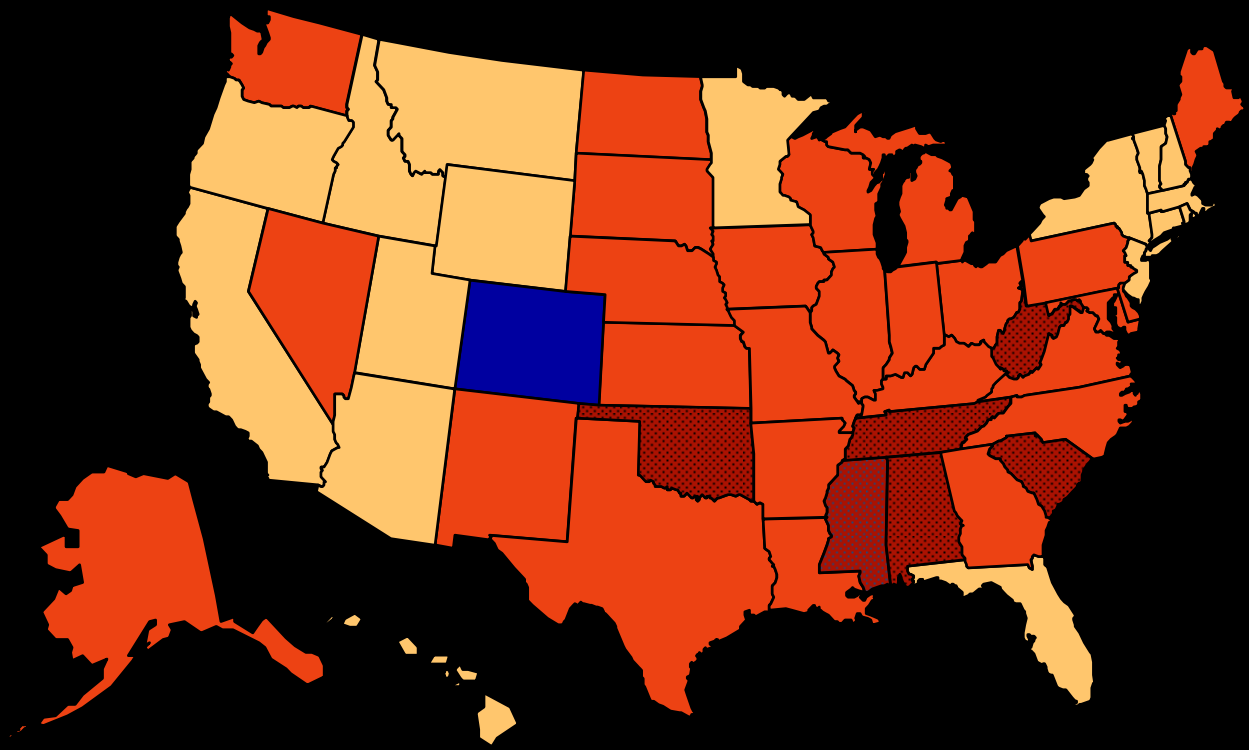
No Data | <10% | 10%–14% | 15%–19% | 20%–24% | 25%–29% | ≥30%

2007



No Data | <10% | 10%–14% | 15%–19% | 20%–24% | 25%–29% | ≥30%

2008

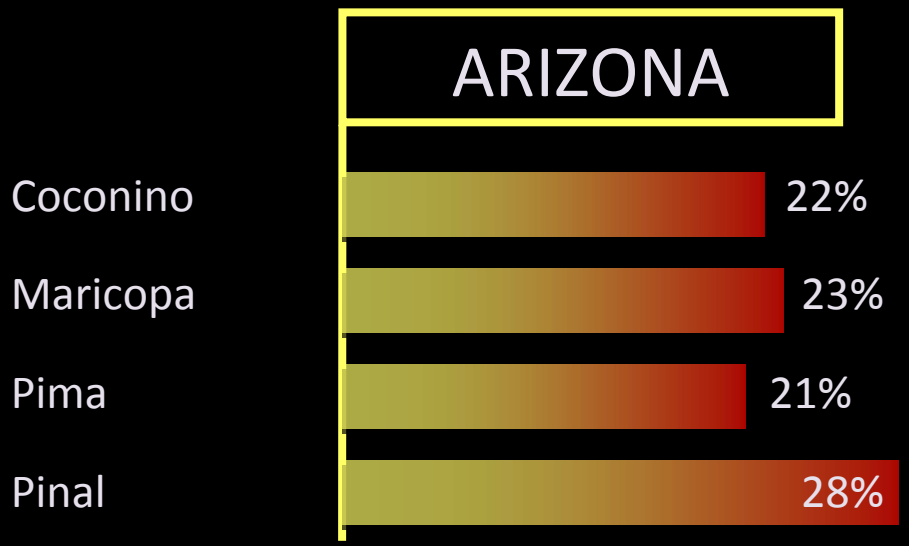


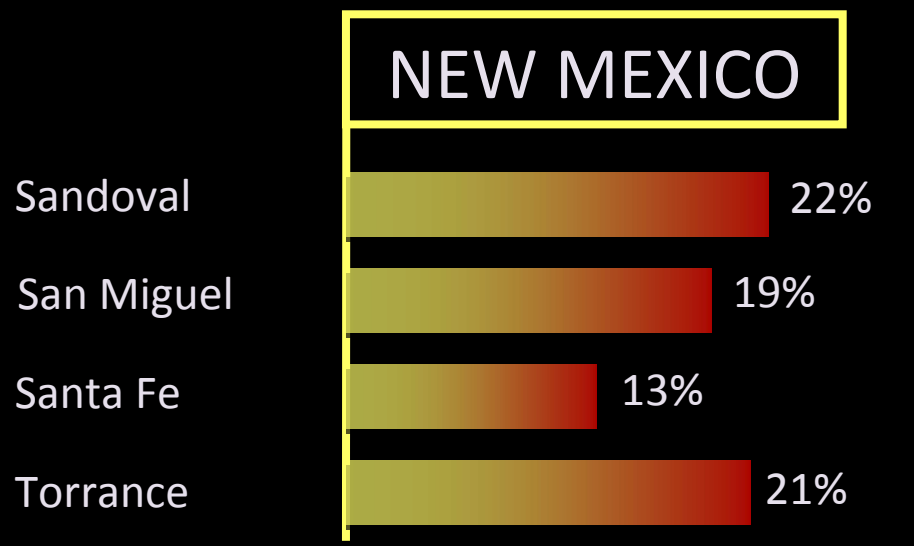
No Data | <10% | 10%–14% | 15%–19% | 20%–24% | 25%–29% | ≥30%

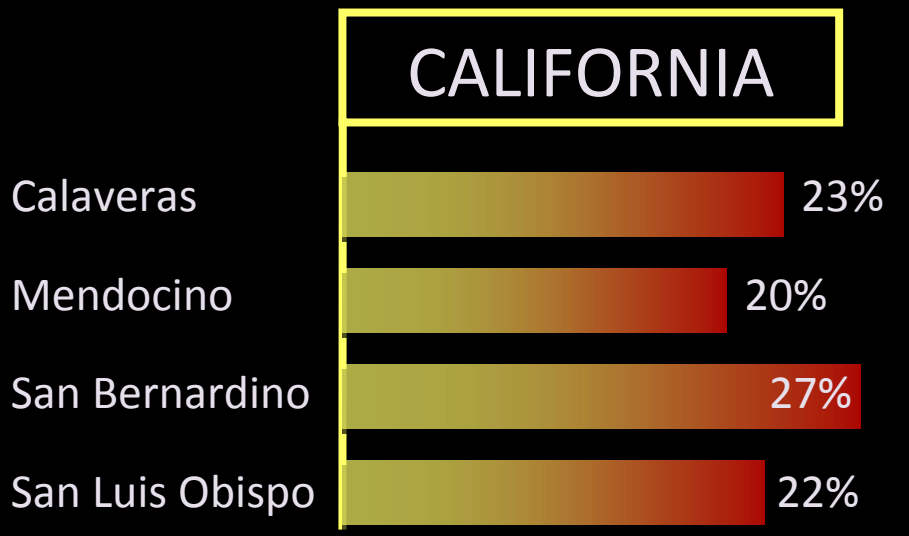
Obesity Epidemic

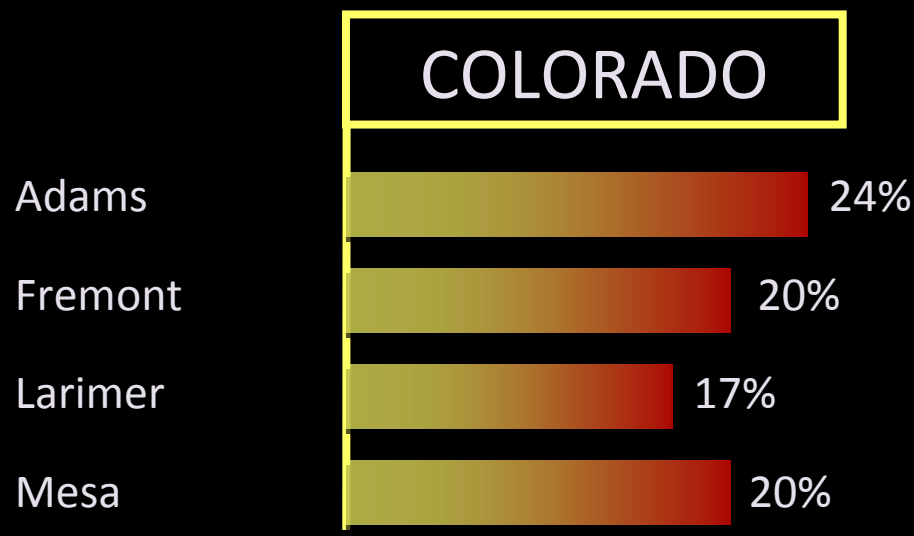
- Significant differences between states
- Significant differences between local places

Health Indicators – Adult Obesity

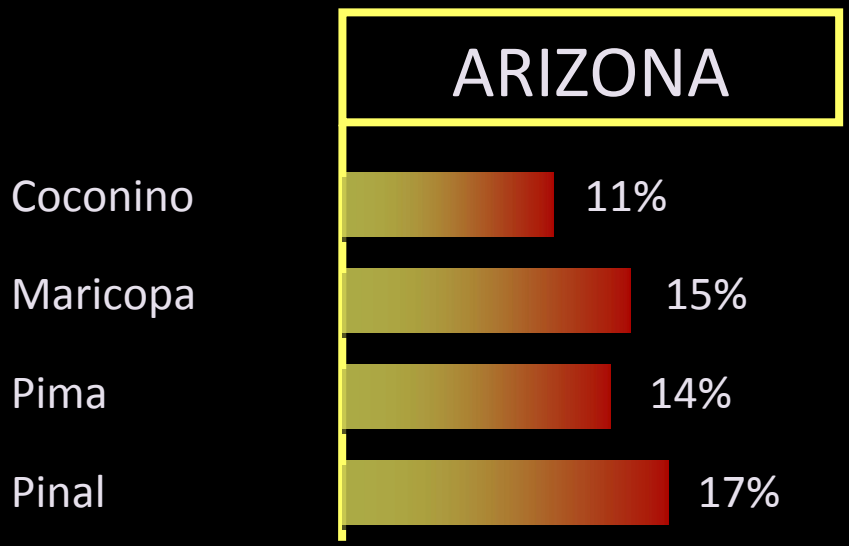


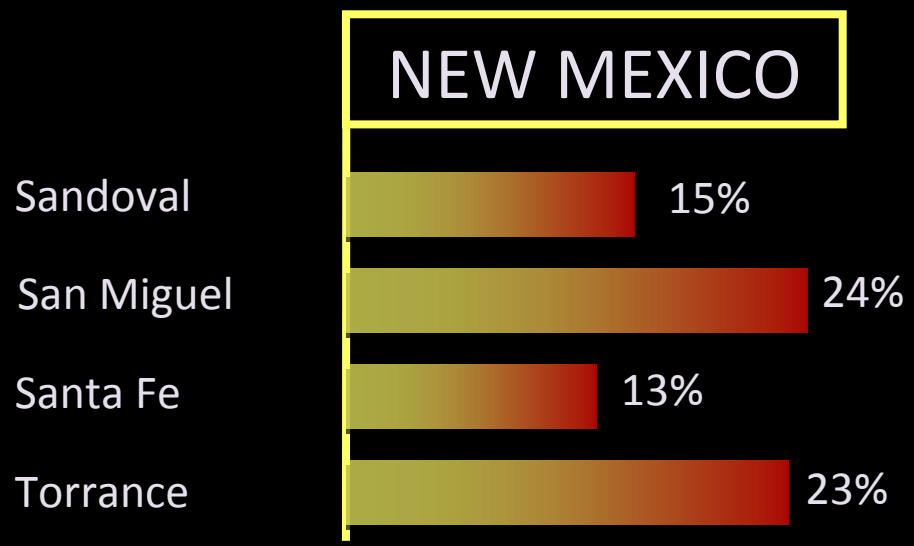


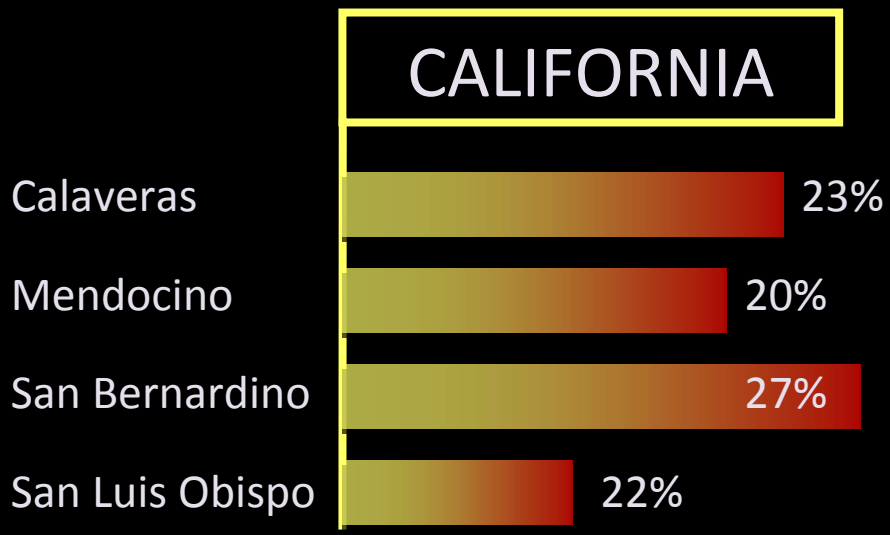


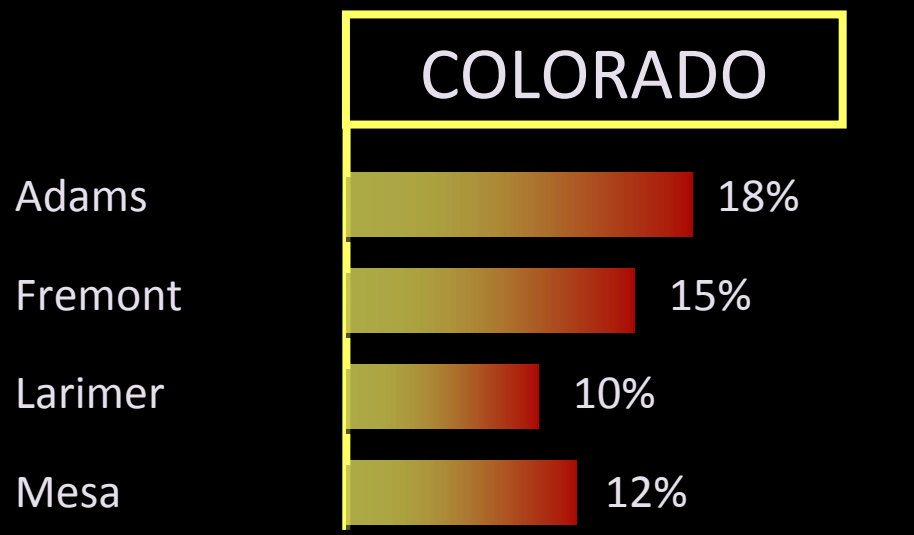


Health Indicators – Poor or Fair Health









Issues Influencing How Americans Vote

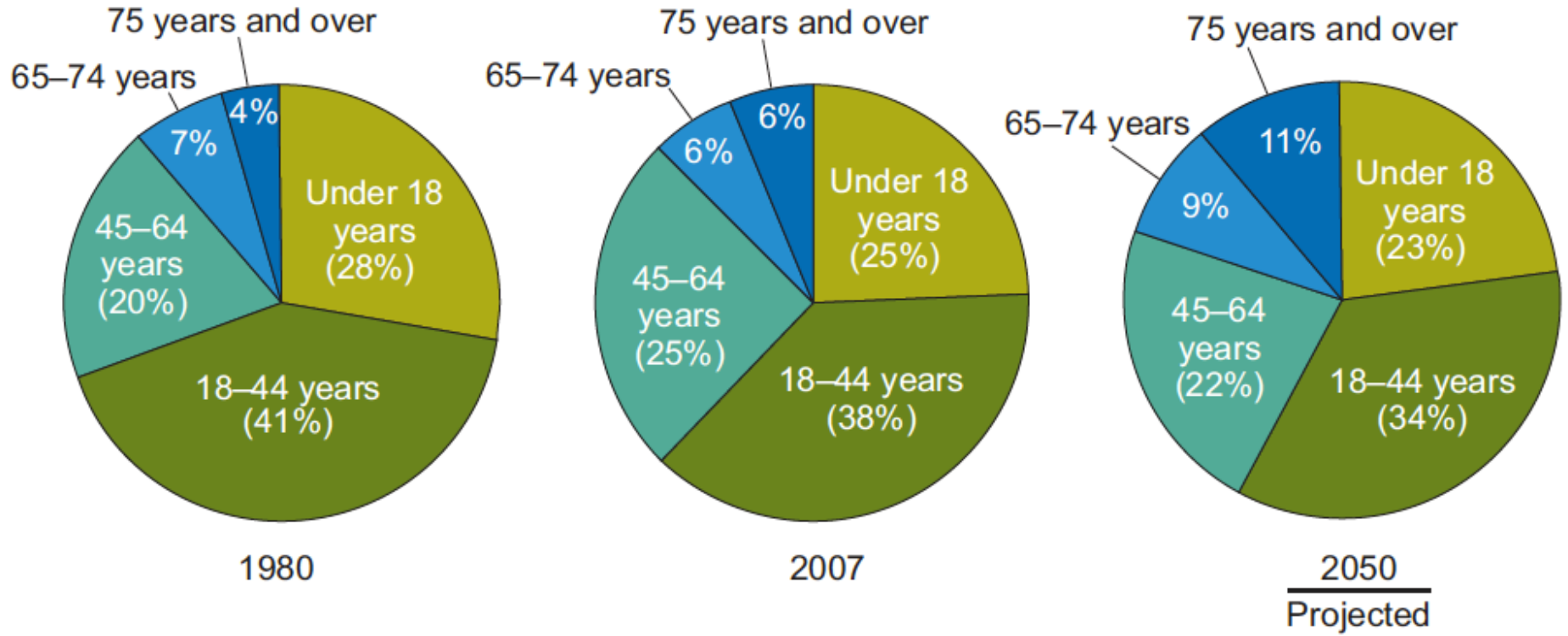
(% Very Important + Somewhat Important)

Economy	96%
Government Ethics	96%
National Security	92%
Social Security	89%
Taxes	88%
Education	88%
Health Care	87%
Immigration	87%
War in Iraq	83%
Abortion	64%

Source: Rasmussen Reports, May 2010

Increased Exposure to Health Care Costs

Figure 1B. Percent distribution of the total population, by age: United States, 1980, 2007, 2050

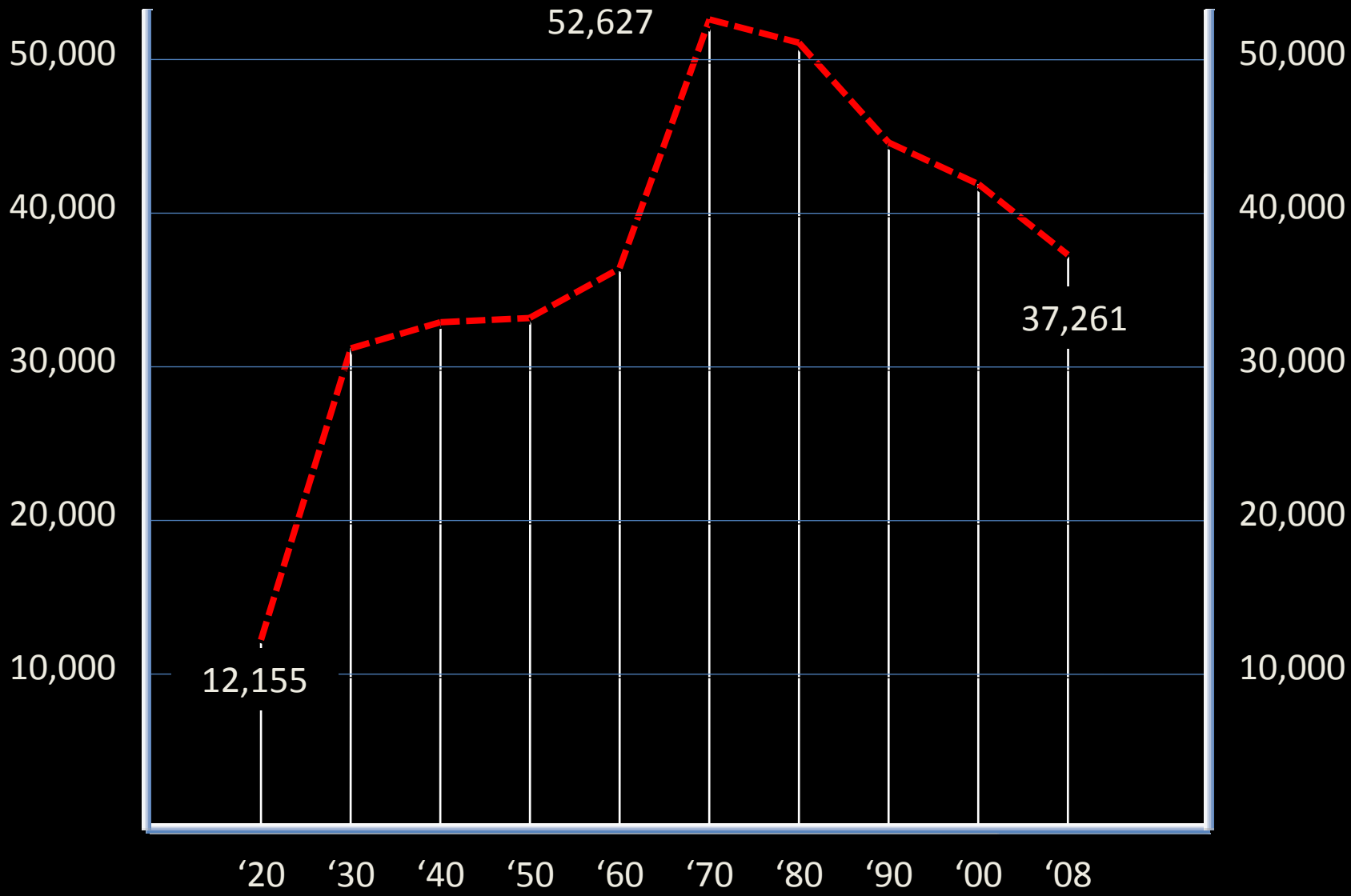


US Dept of Health and Human Services, 2009 Annual Report

Transportation & Public Health

Traffic Safety + Personal Health

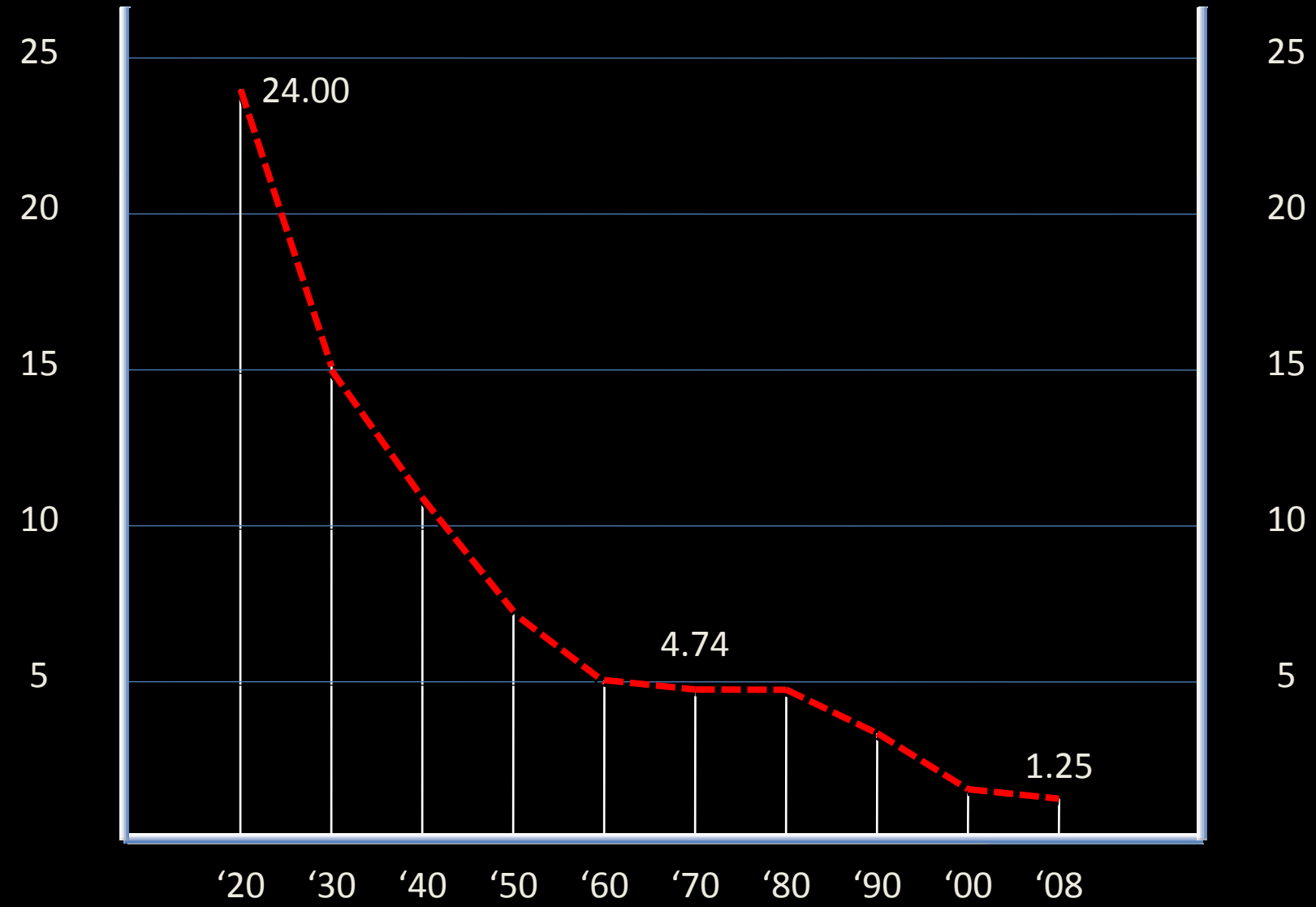
Annual US Traffic Fatalities



Source: NHTSA, FHWA

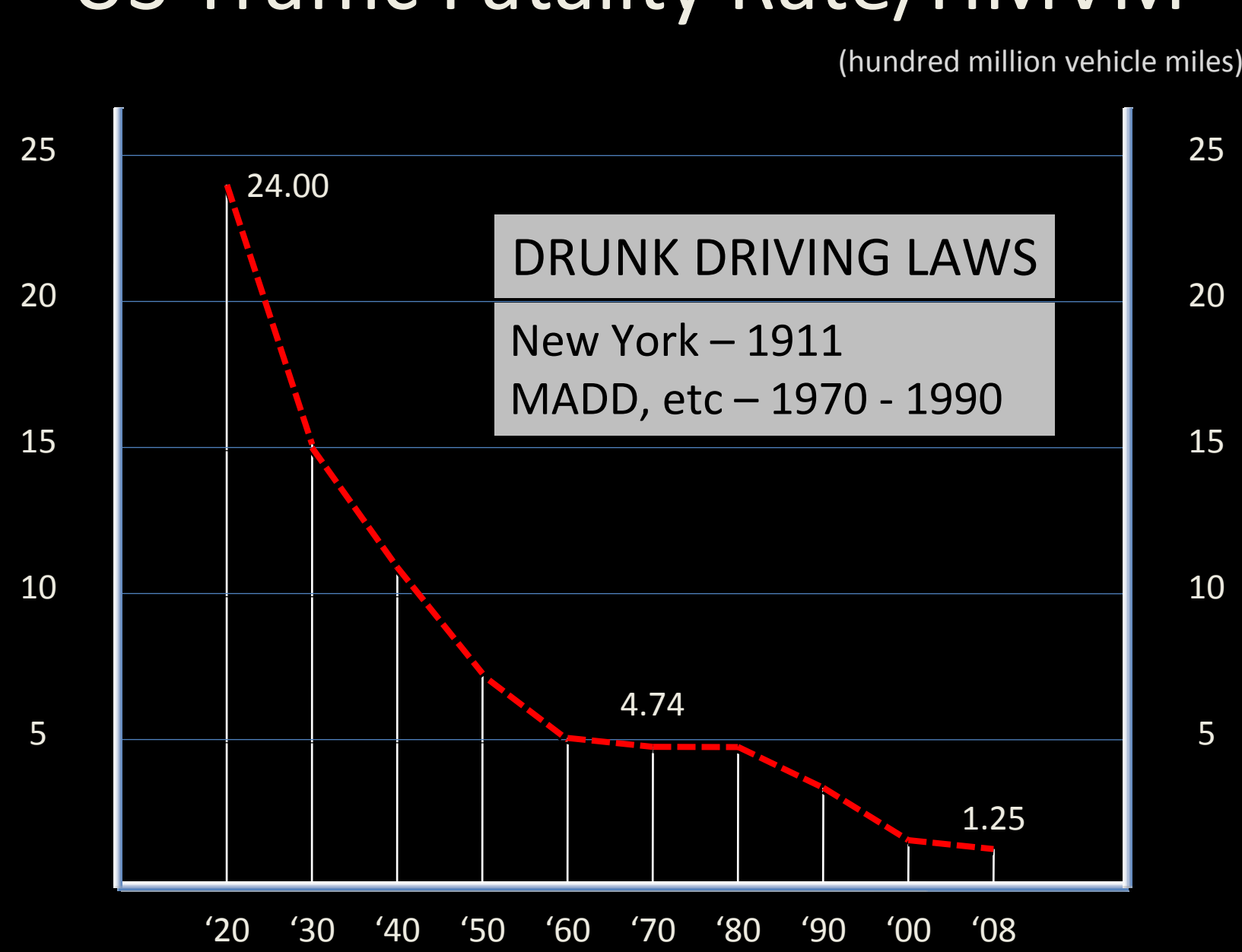
US Traffic Fatality Rate/HMVM

(hundred million vehicle miles)



Source: NHTSA, FHWA

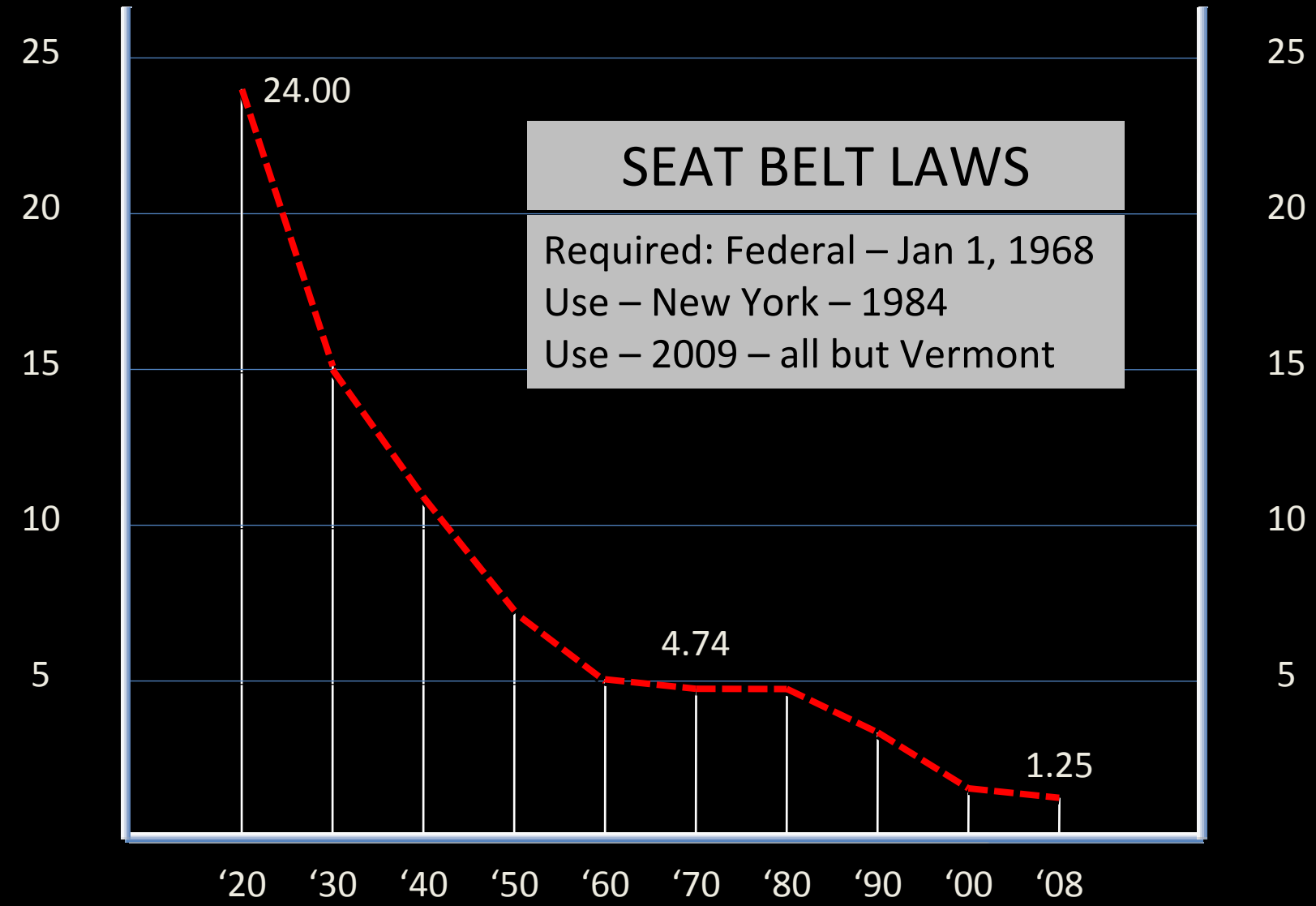
US Traffic Fatality Rate/HMVM



Source: NHTSA, FHWA

US Traffic Fatality Rate/HMVM

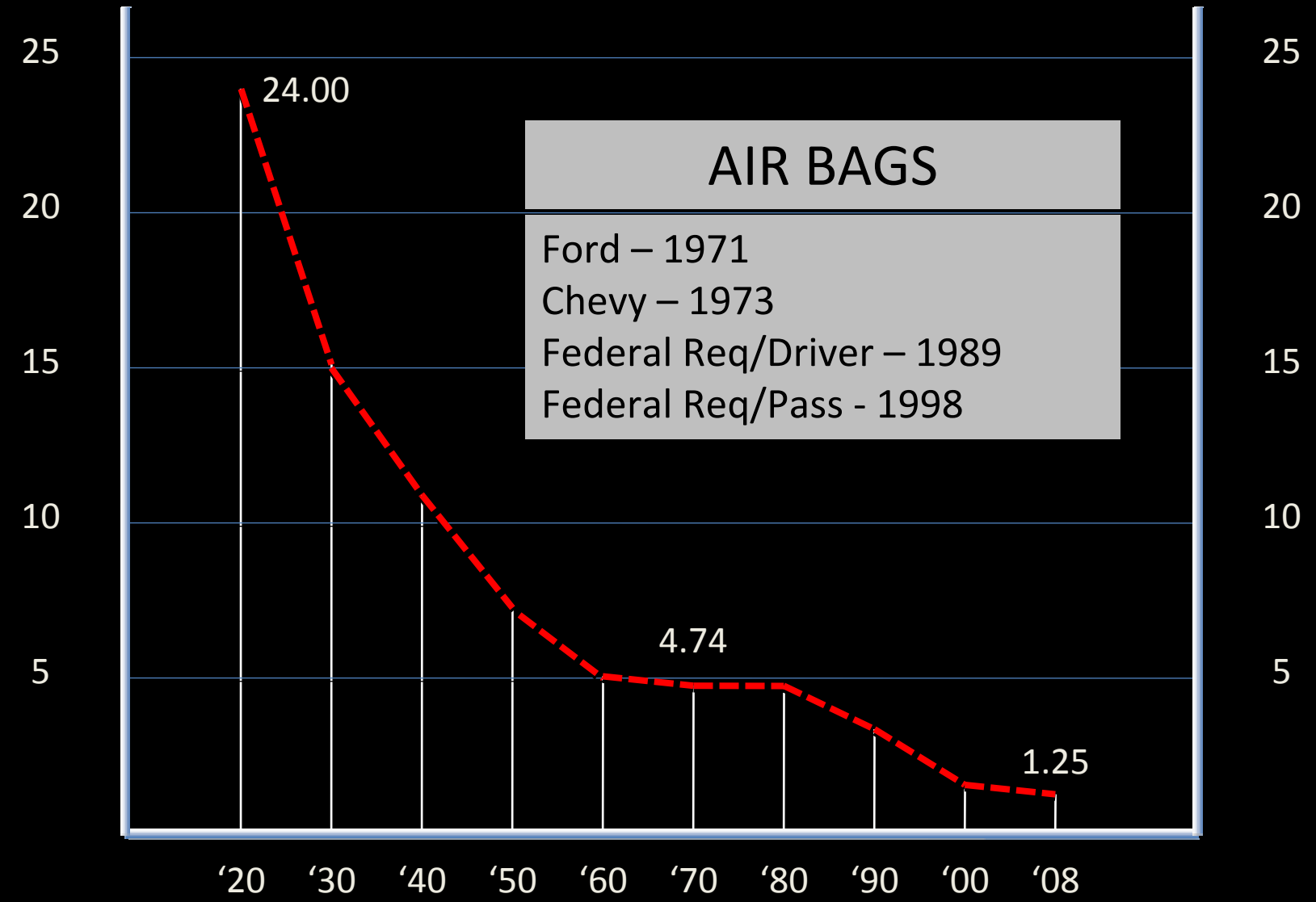
(hundred million vehicle miles)



Source: NHTSA, FHWA

US Traffic Fatality Rate/HMVM

(hundred million vehicle miles)



Source: NHTSA, FHWA

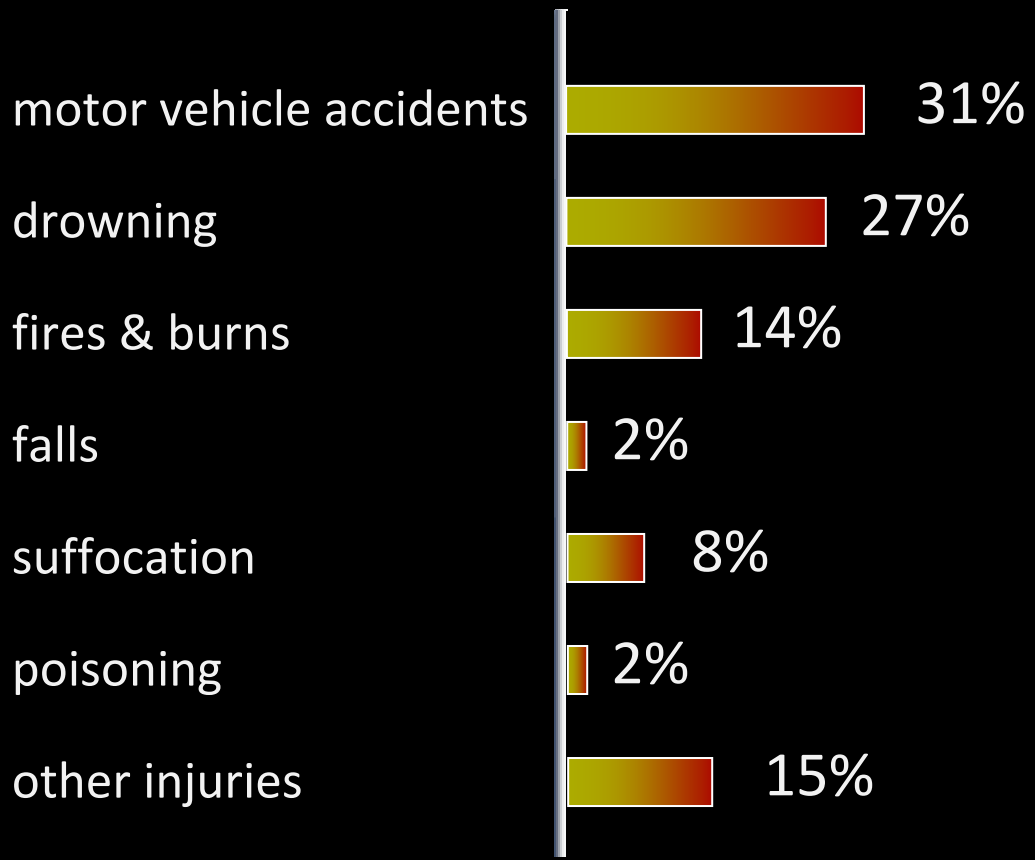
“Changes in highway infrastructure between 1984 and 1997 have not reduced traffic fatalities and injuries, and have even had the effect of increasing total fatalities and injuries.

Other factors, primarily changes in the demographic age mix of the population, increased seat belt usage, and improvements in medical technology are responsible for the downward trend in fatal accidents.”

Noland, R. B. 2001, Transportation Research Board

Traffic accidents are the leading cause of unintentional injury death in children

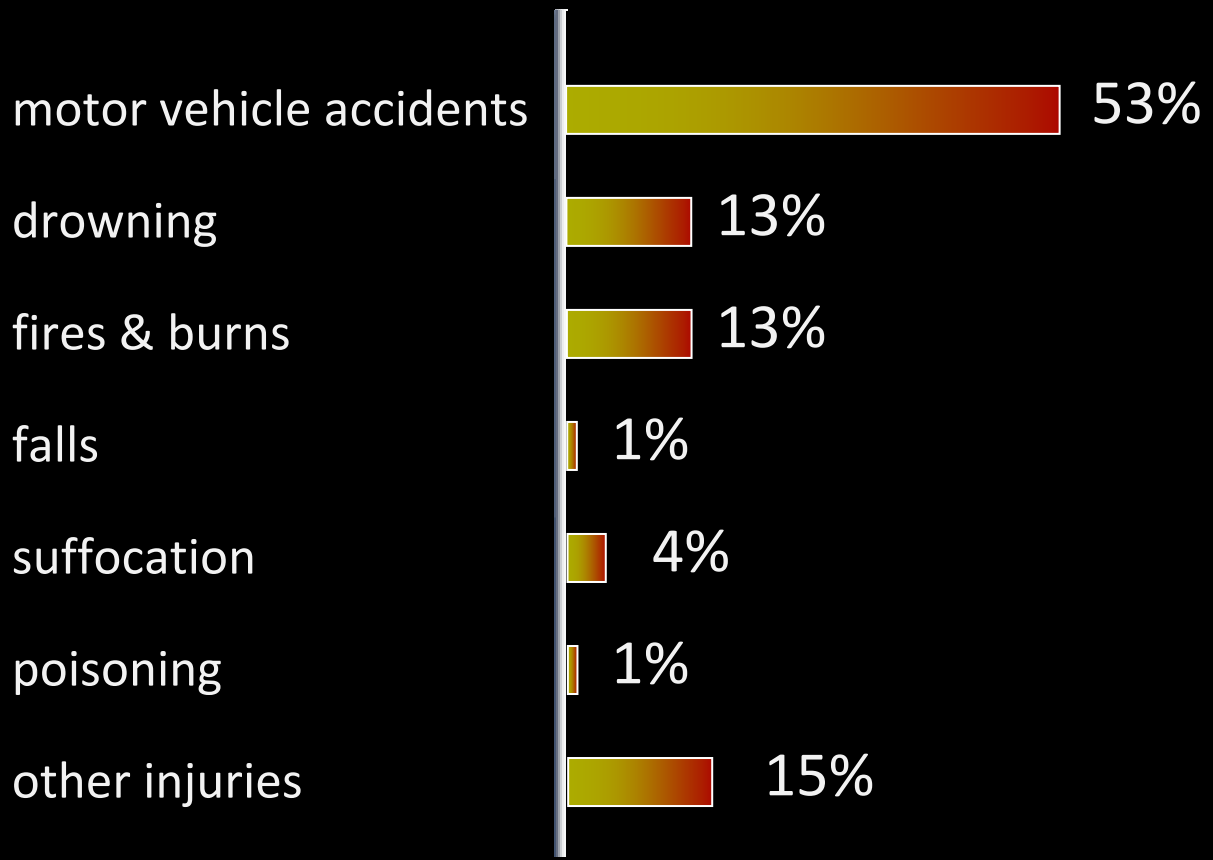
age 1 - 4



Source: CDC National Vital Statistics System, 2000 - 2005

Traffic accidents are the leading cause of unintentional injury death in children

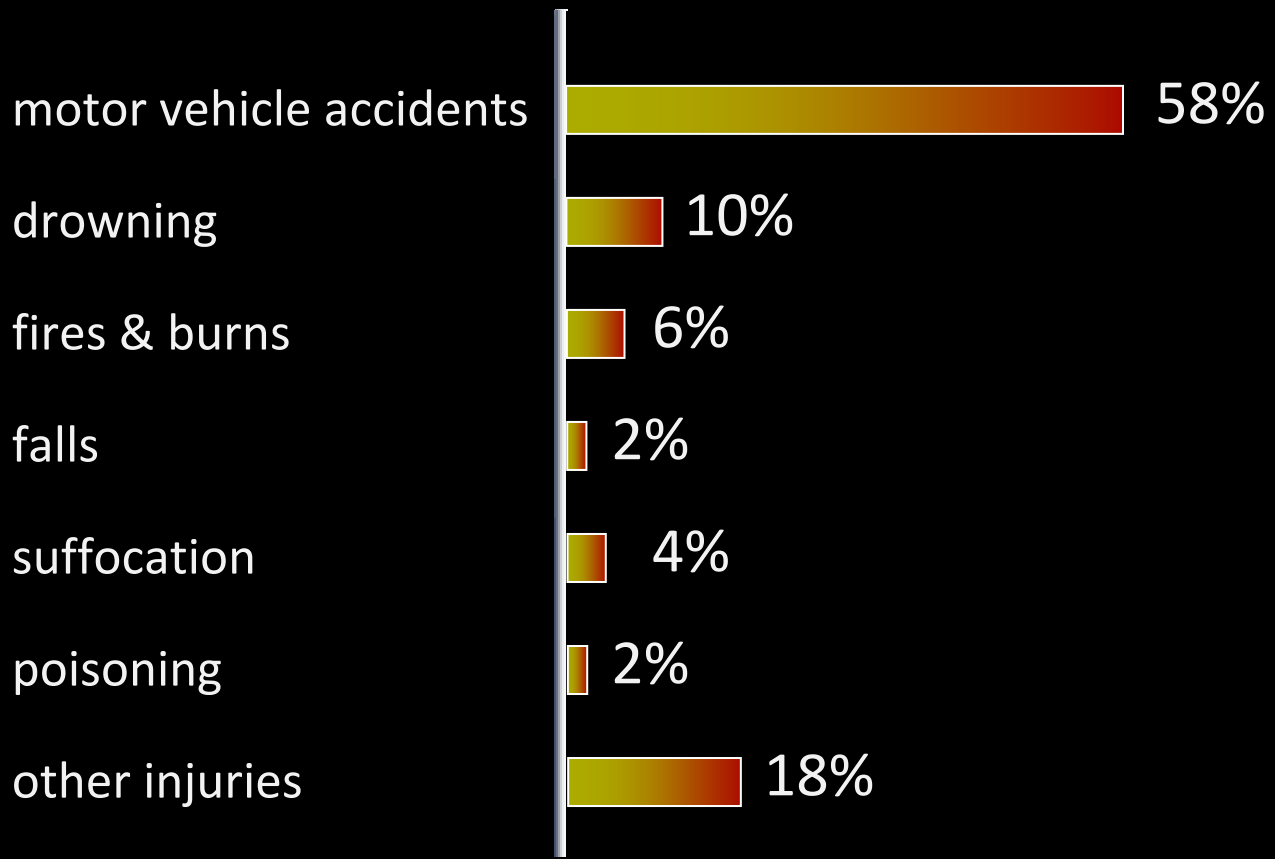
age 5 – 9



Source: CDC National Vital Statistics System, 2000 - 2005

Traffic accidents are the leading cause of unintentional injury death in children

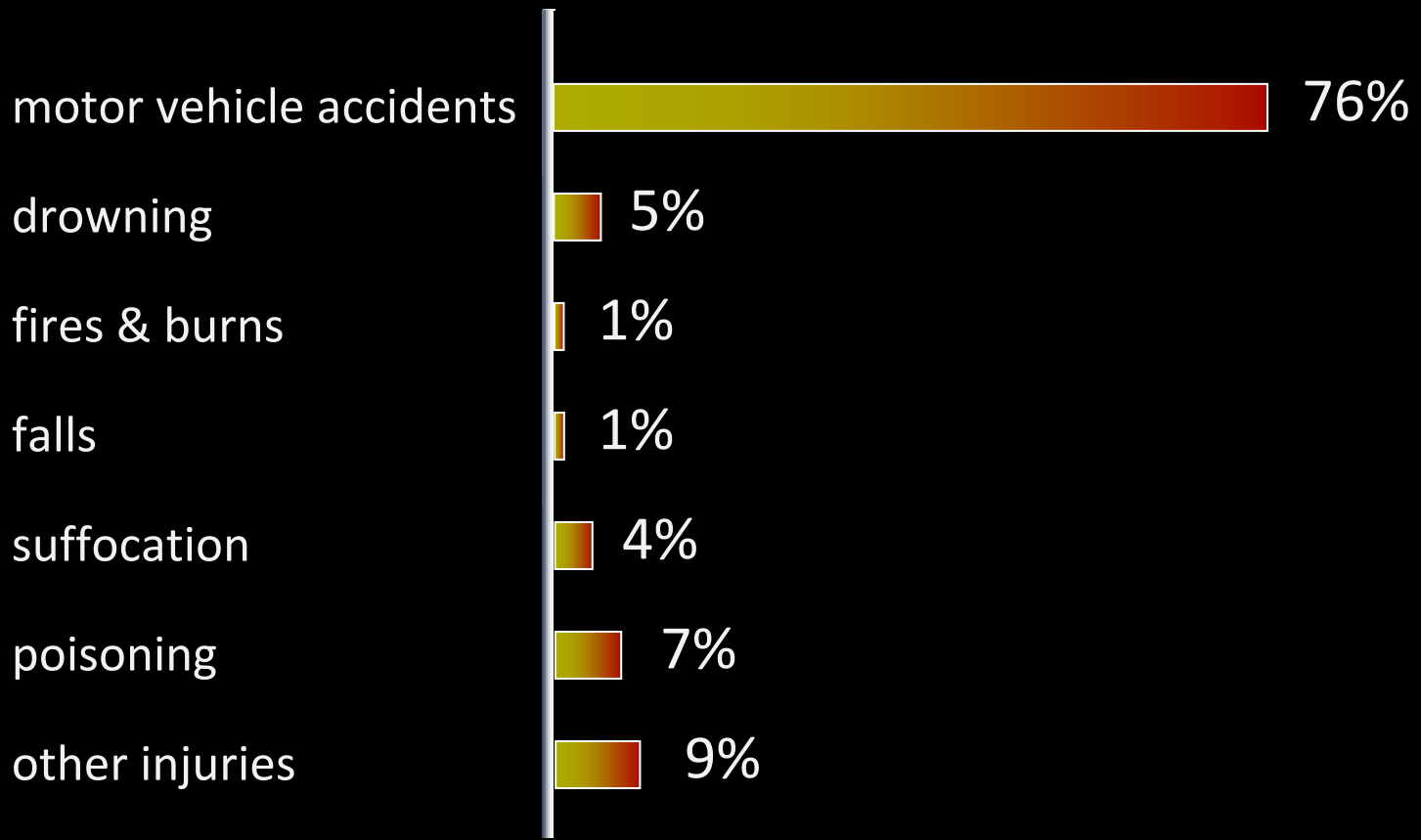
age 10 – 14



Source: CDC National Vital Statistics System, 2000 - 2005

Traffic accidents are the leading cause of unintentional injury death in children

age 15 – 19



Source: CDC National Vital Statistics System, 2000 - 2005

Five things that worry parents the most:

- Kidnapping
- School snipers
- Terrorists
- Dangerous strangers
- Drugs

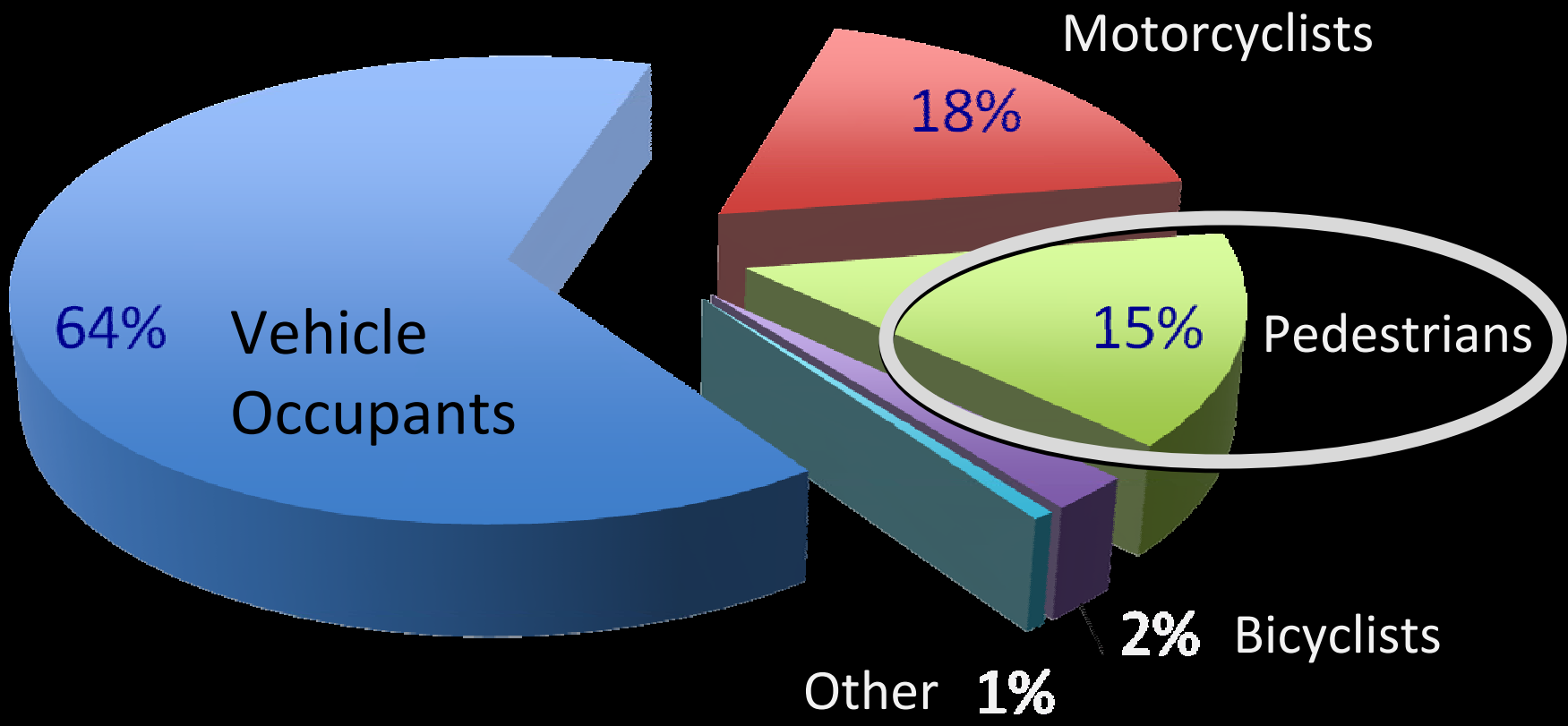
Five things most likely to cause injury or death (children < 18):

- Car accidents
- Homicide*
- Child abuse
- Suicide
- Drowning

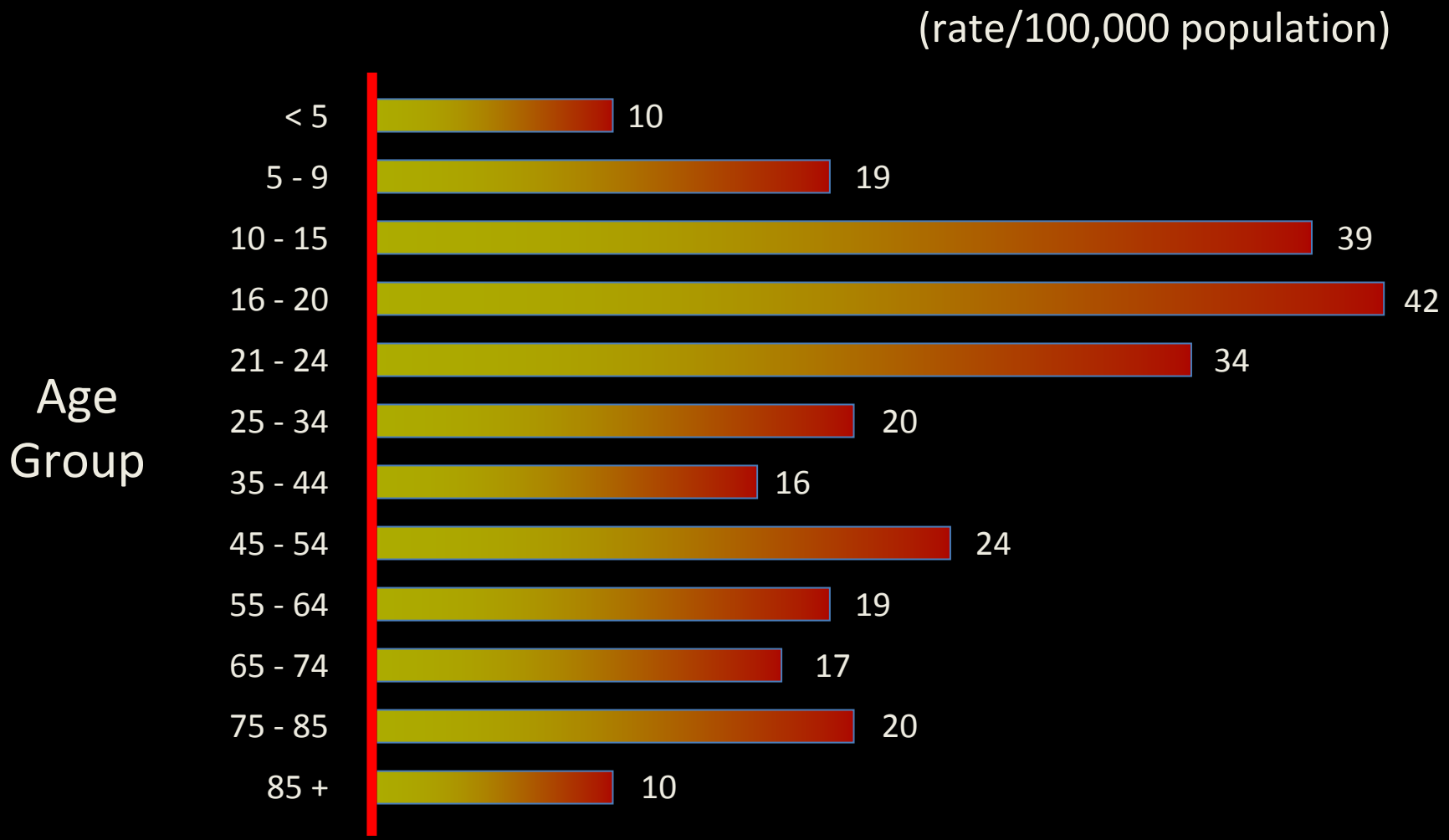
* someone they know

The most dangerous thing your child does, statistically, is get into a car with you.

2008 Fatalities

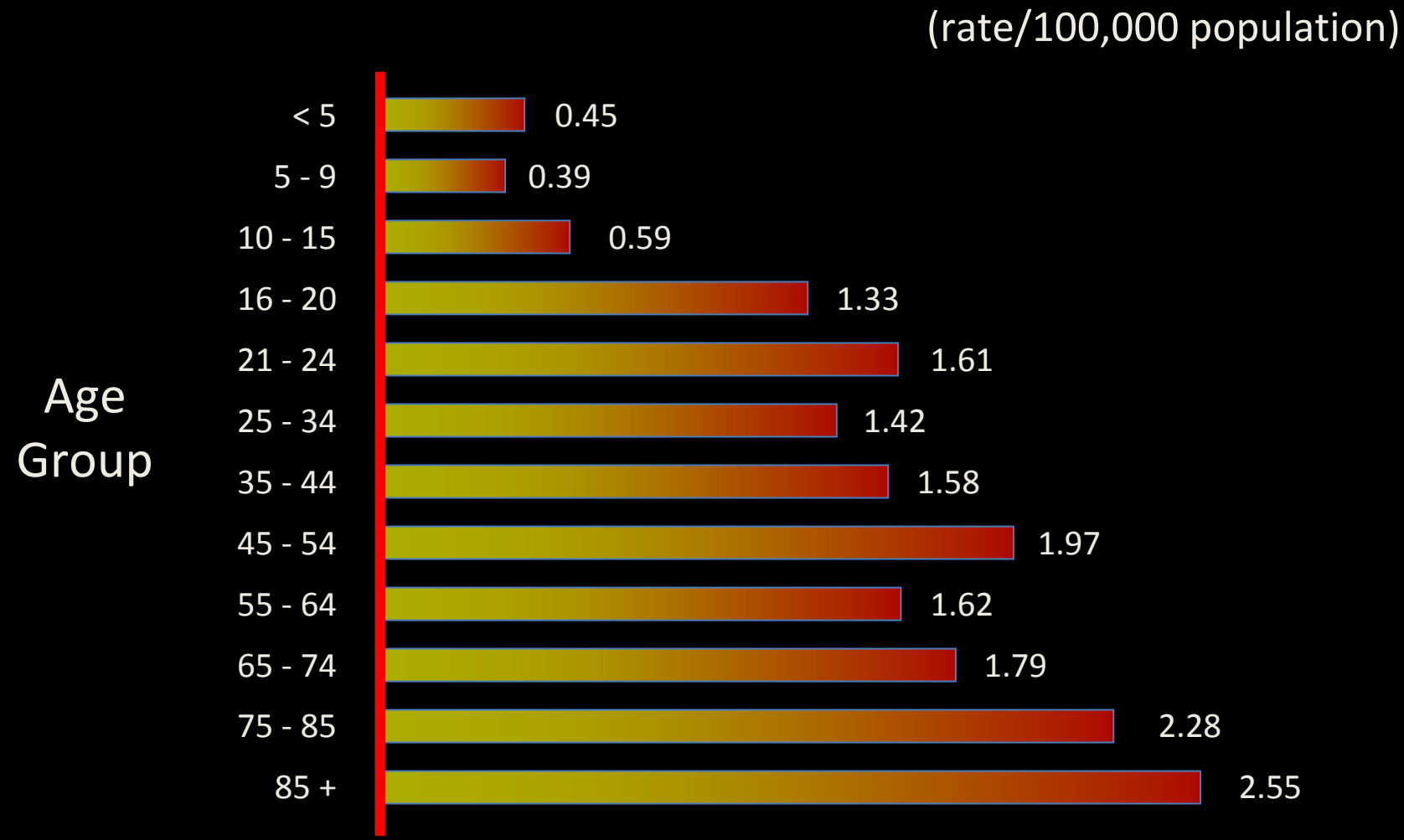


US Injury Rate: Pedestrians Hit by Motor Vehicles



Source: NHTSA, 2008

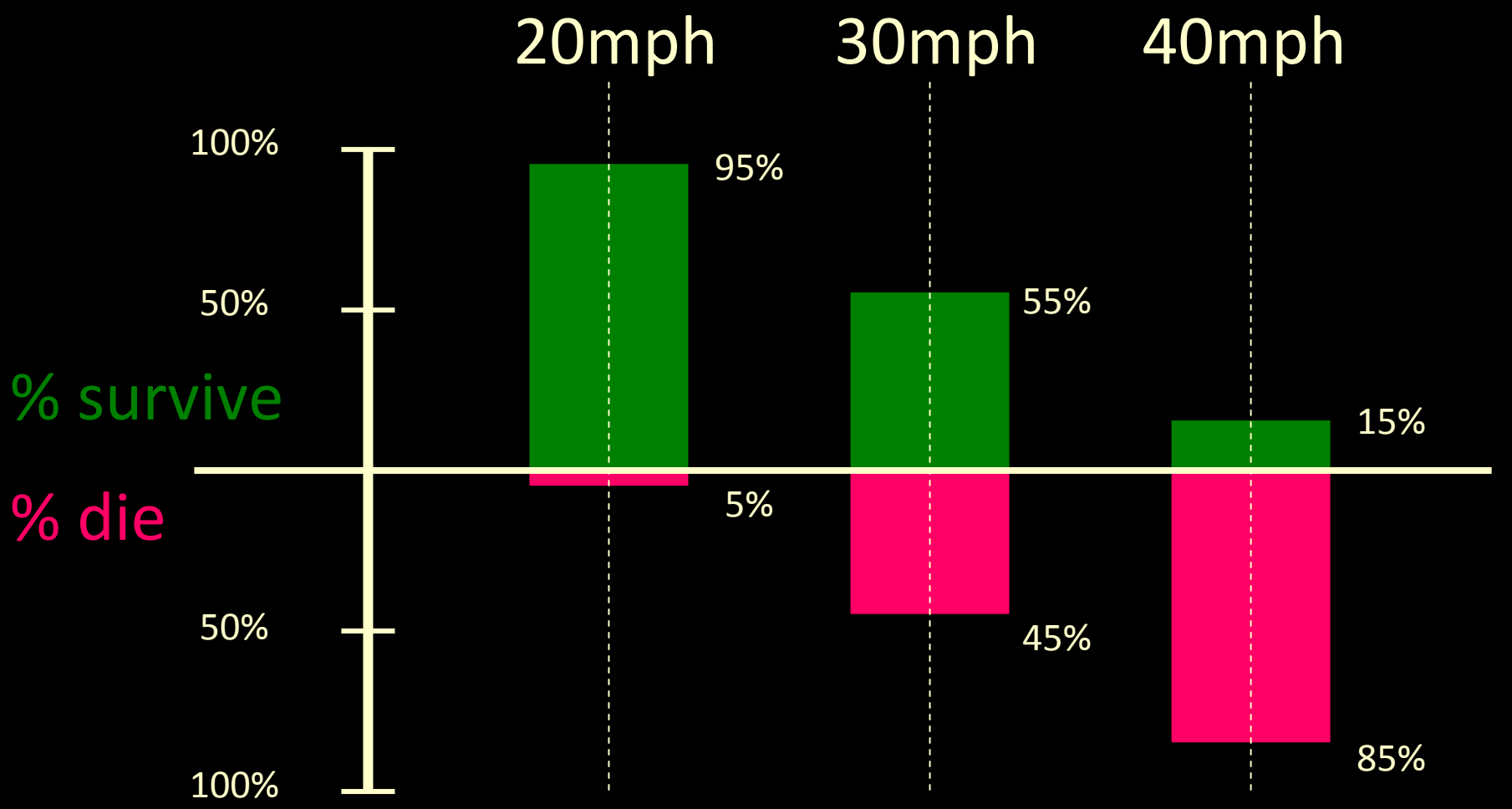
US Fatality Rate: Pedestrians Hit by Motor Vehicles



Source: NHTSA, 2008

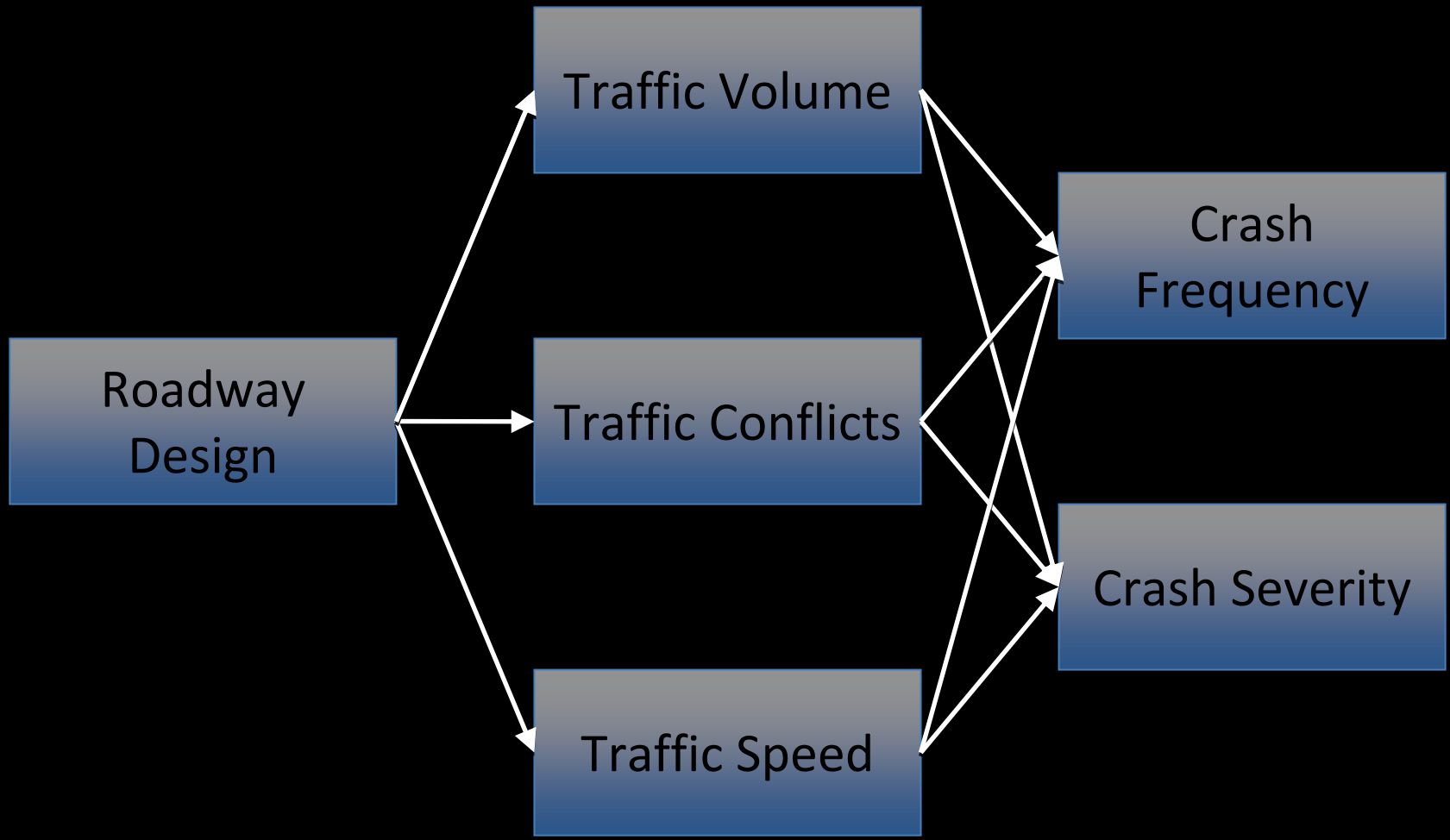
Honolulu

pedestrian survival rates & vehicle speed



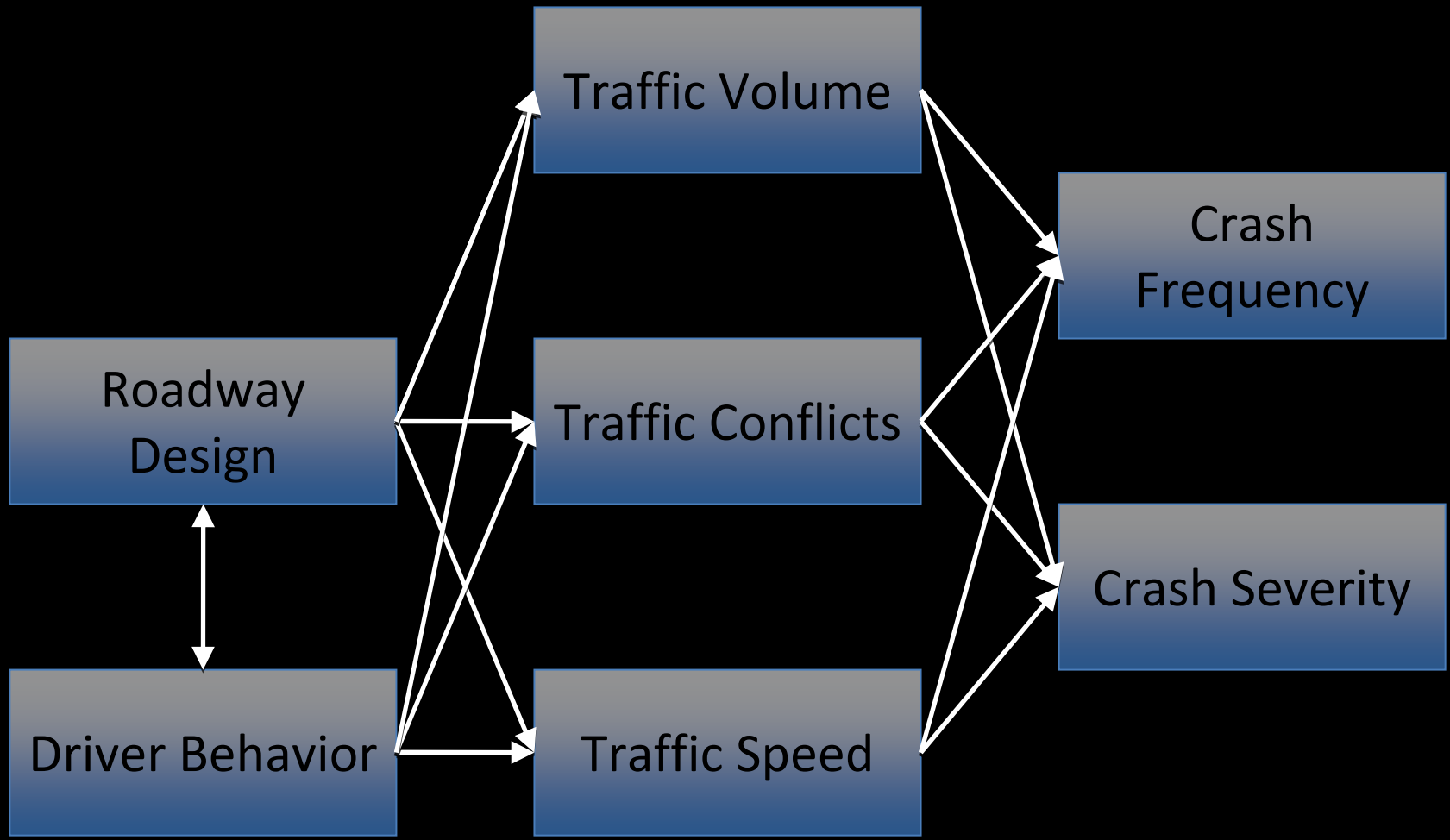

FATBOY'S
AMINA PIZZERIA
LIQUOR
OPEN
Meadow Gold

Pre-1950 Traffic Safety Model



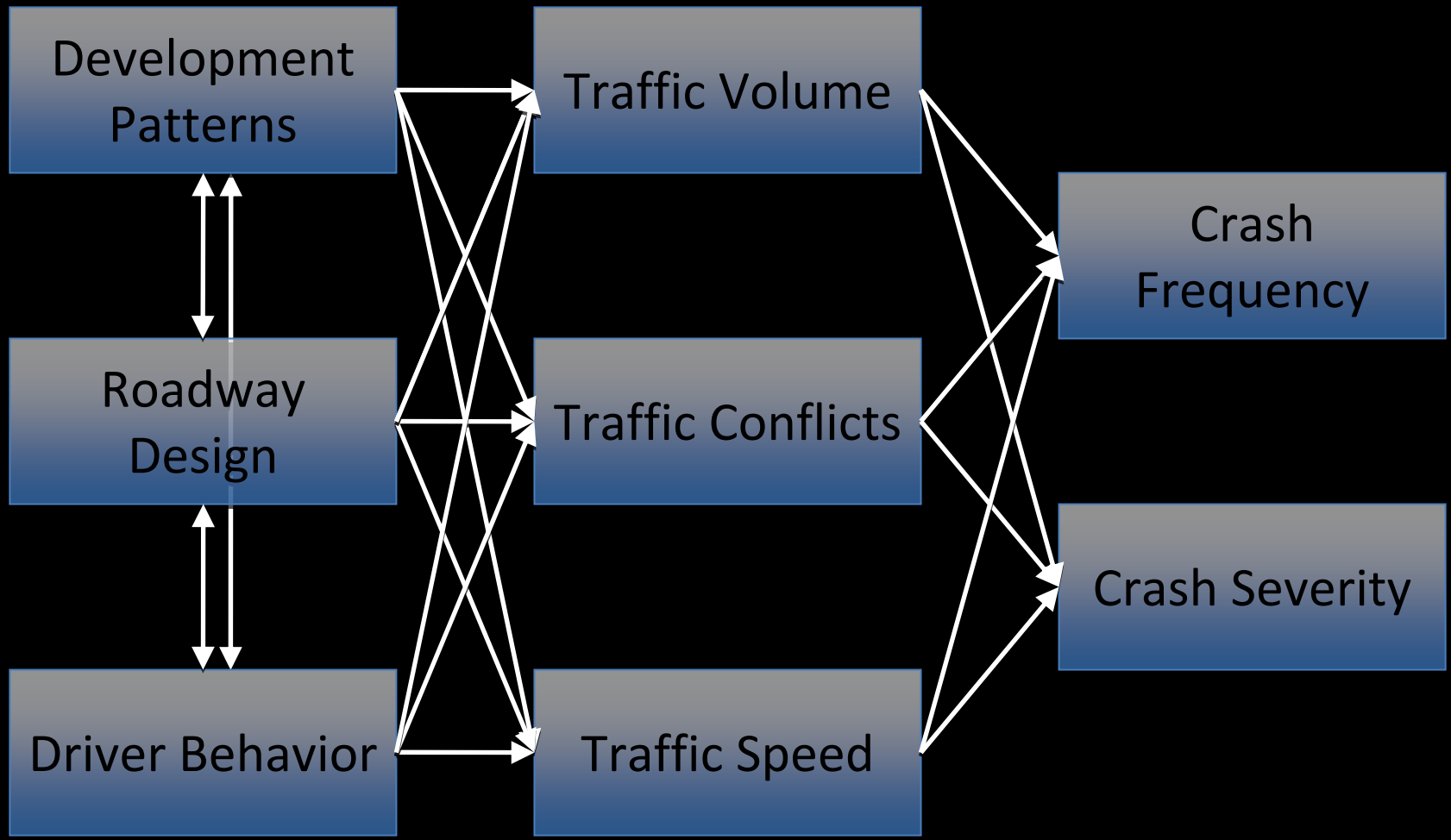
Based on and Revised from Ewing and Dumbaugh, Journal of Planning Literature, Vol. 23, No. 4

Traditional Traffic Safety Model

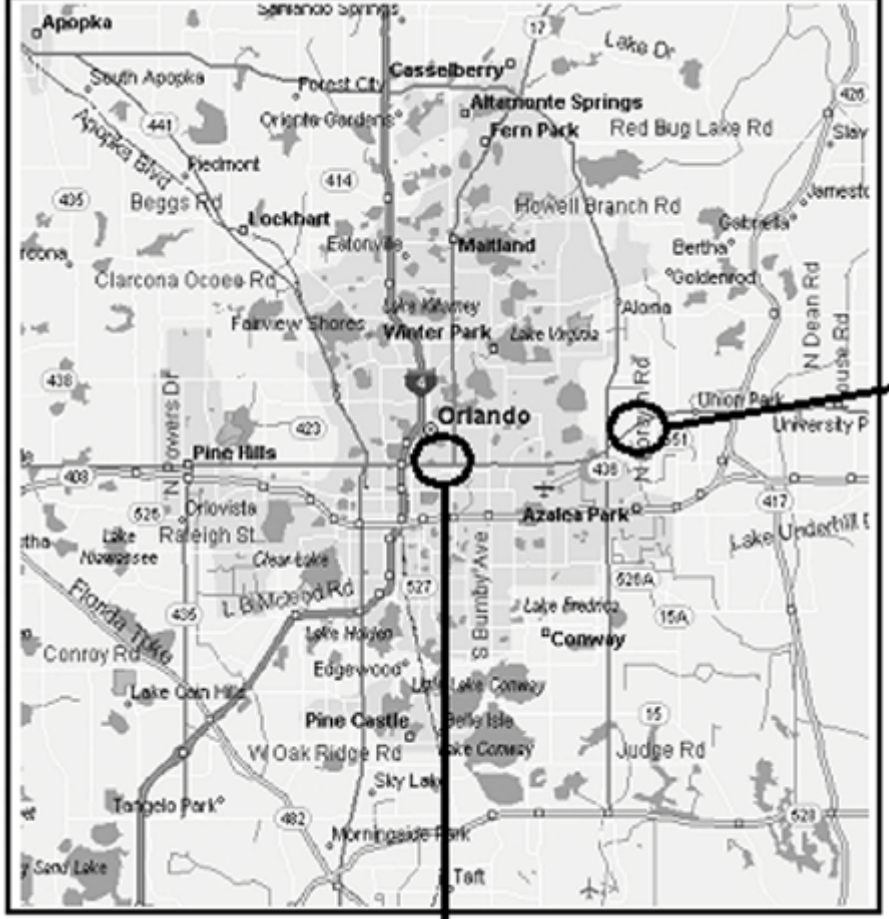


Based on and Revised from Ewing and Dumbaugh, Journal of Planning Literature, Vol. 23, No. 4

Context-Based Traffic Safety Model



Based on and Revised from Ewing and Dumbaugh, Journal of Planning Literature, Vol. 23, No. 4

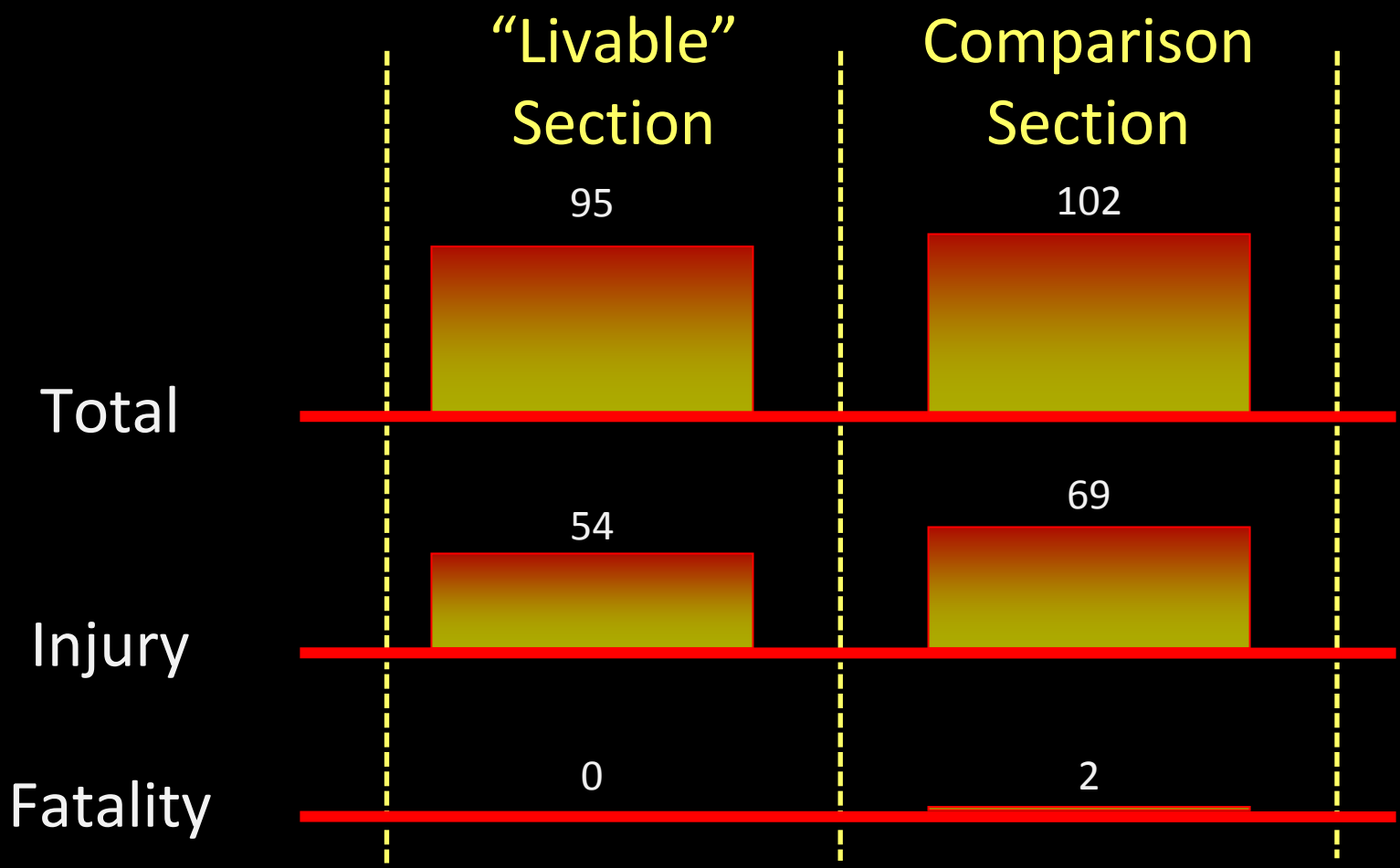


Colonial Drive: Comparison section

Colonial Drive: Livable section

Street/Urban Design

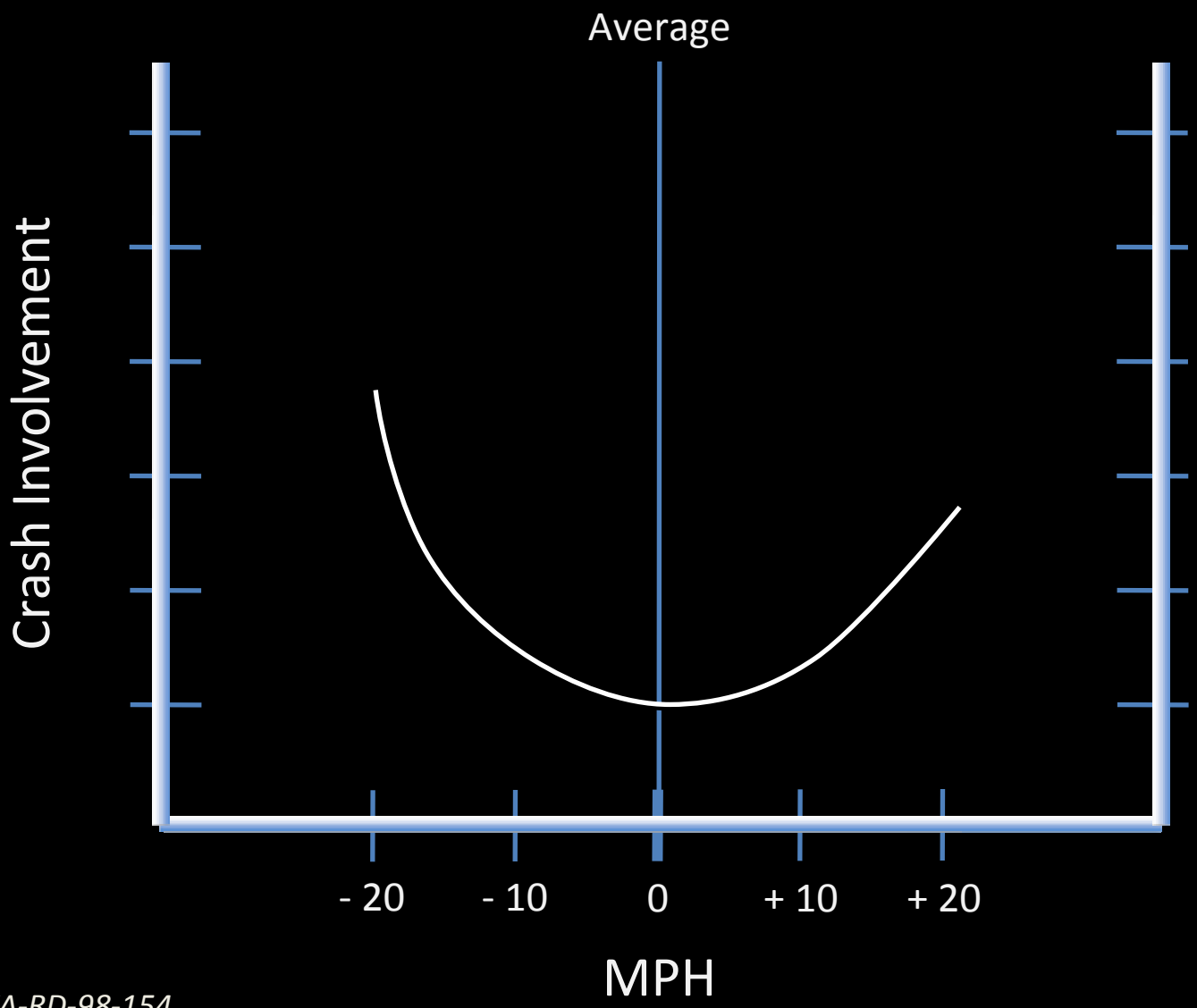
Mid-Block Crashes/100 MVMT



Source: Eric Dumbaugh, JAPA, Summer 2005, Vol. 71, No. 3

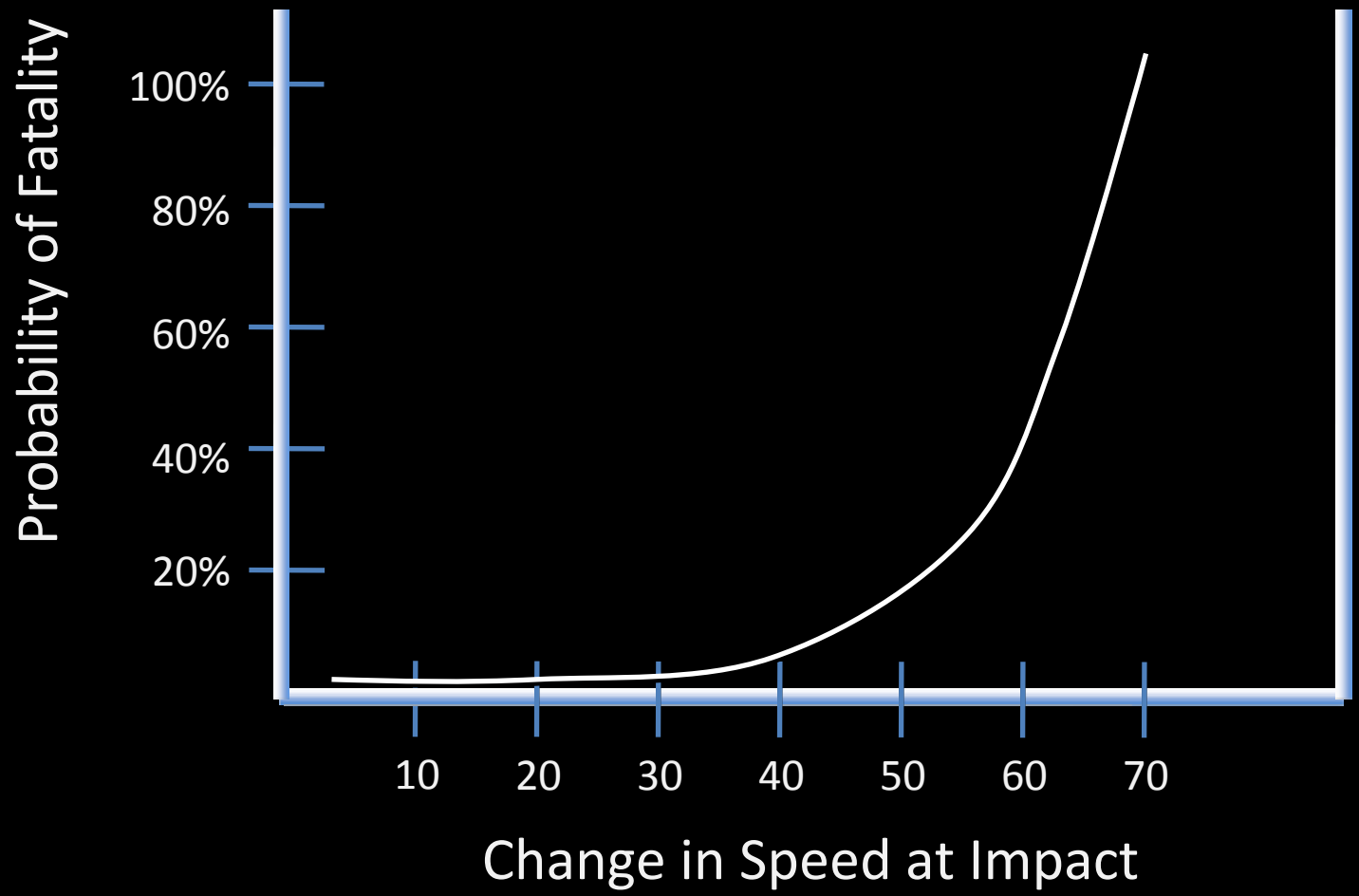
Speed

The U-Shaped Curve



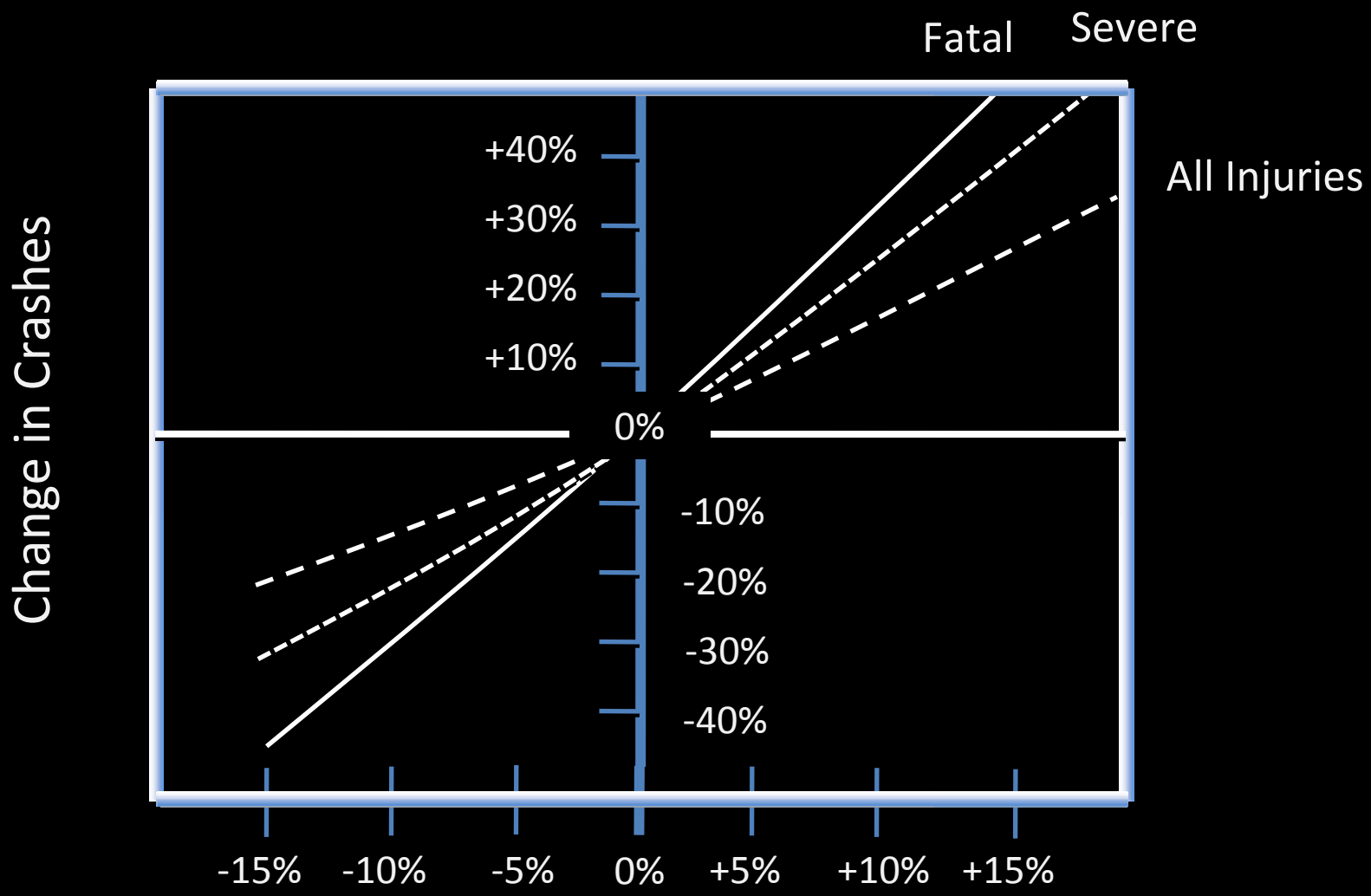
Source: FHWA-RD-98-154

Crash Severity



Source: FHWA-RD-98-154

Changing Speed Limits



Source: FHWA-RD-98-154

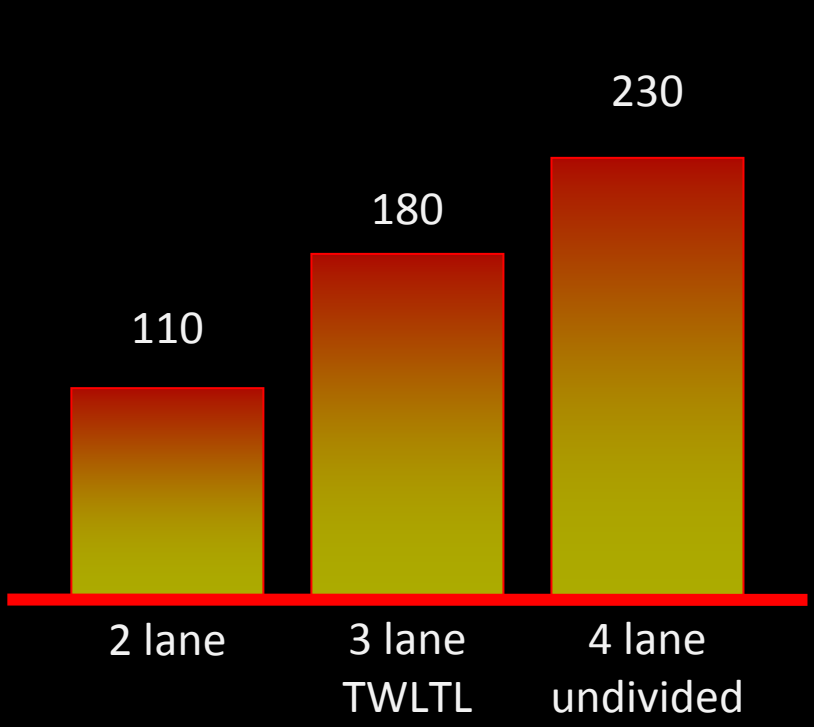
Higher Speeds

- Increase:
  - the rate of injury accidents
  - the severity of accidents
  - the fatality rate
  - the pedestrian fatality rate

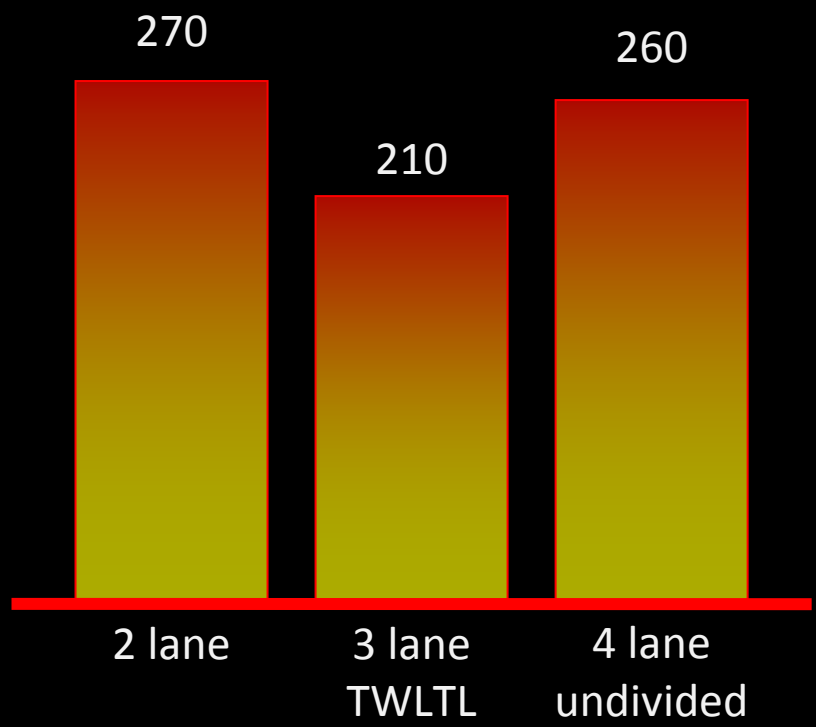
Cross Section

Number of Lanes

Collision Rates – Medium Density – Controlling for ADT



Residential Land Uses

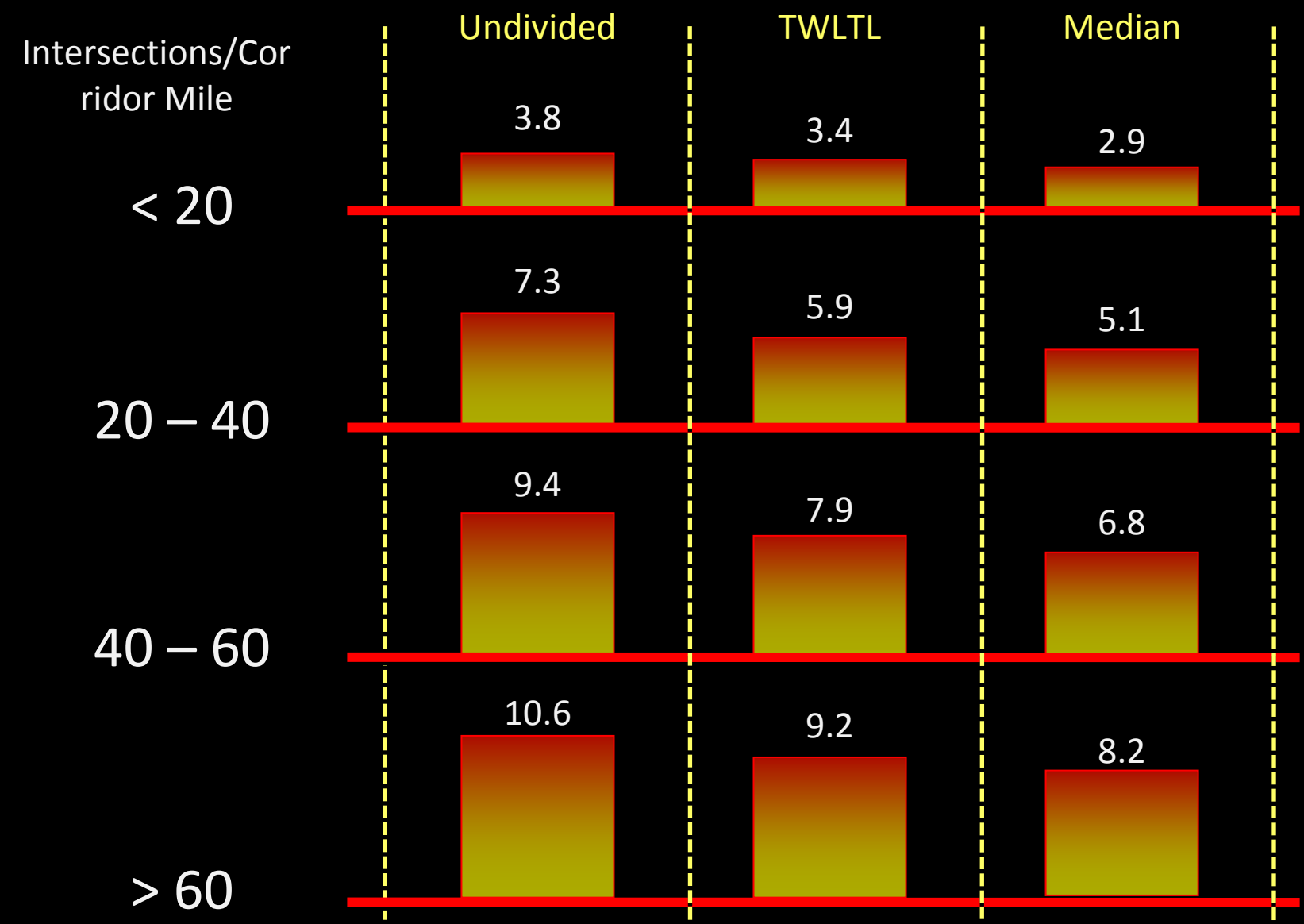


Commercial Land Uses

Source: Hummer and Lewis, FHWA/NC/2000-003, NCSU

Wider, less congested streets are not safer.

Accident Rates + Access Management



Source: Hummer and Lewis, FHWA/NC/2000-003, NCSU

Undivided multi-lane streets and especially streets with two-way left turn lanes are more dangerous than streets with medians.

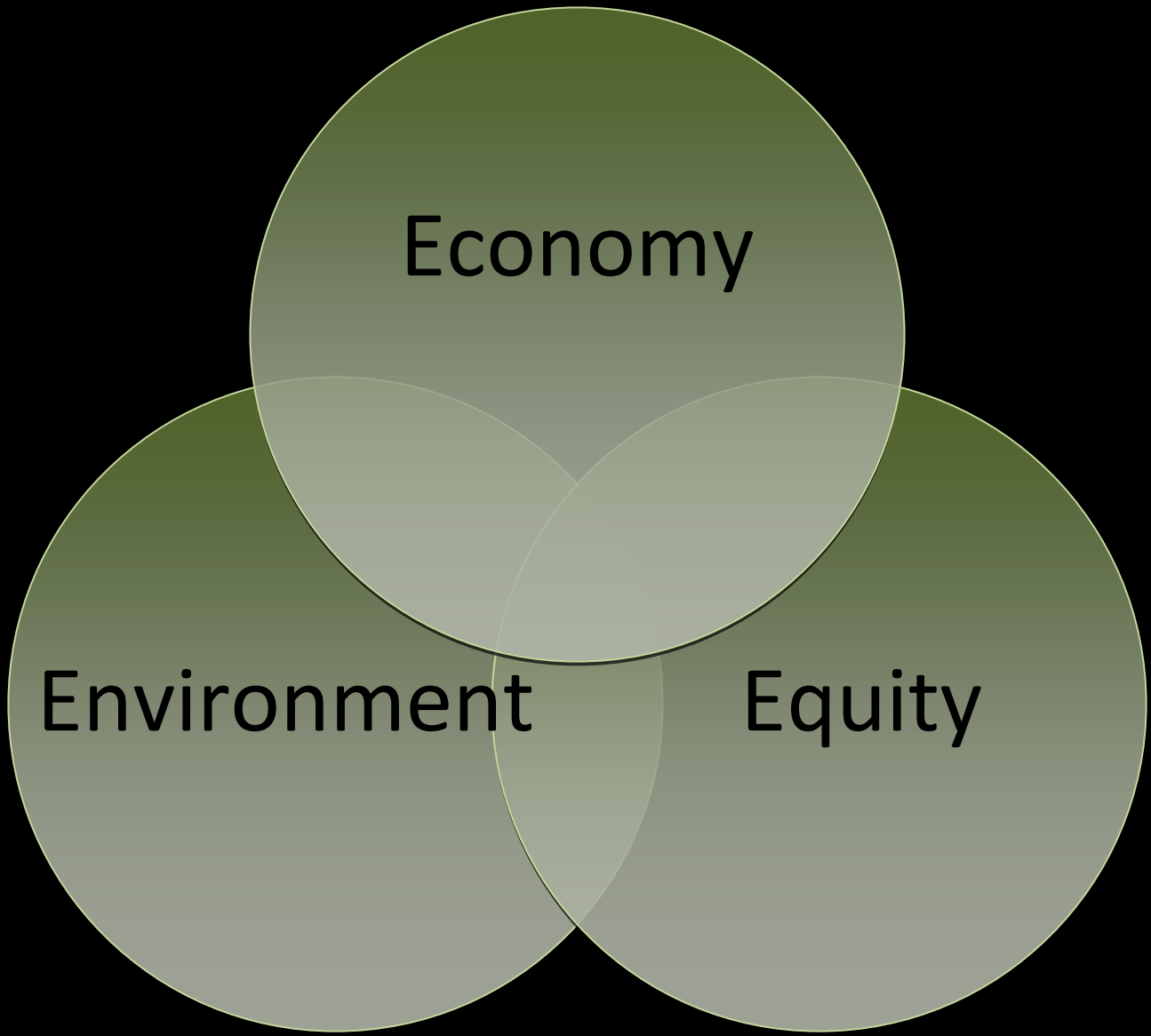
BOTTOM LINE:

Public health is becoming a huge factor in our economy and is directly affected by our transportation choices.

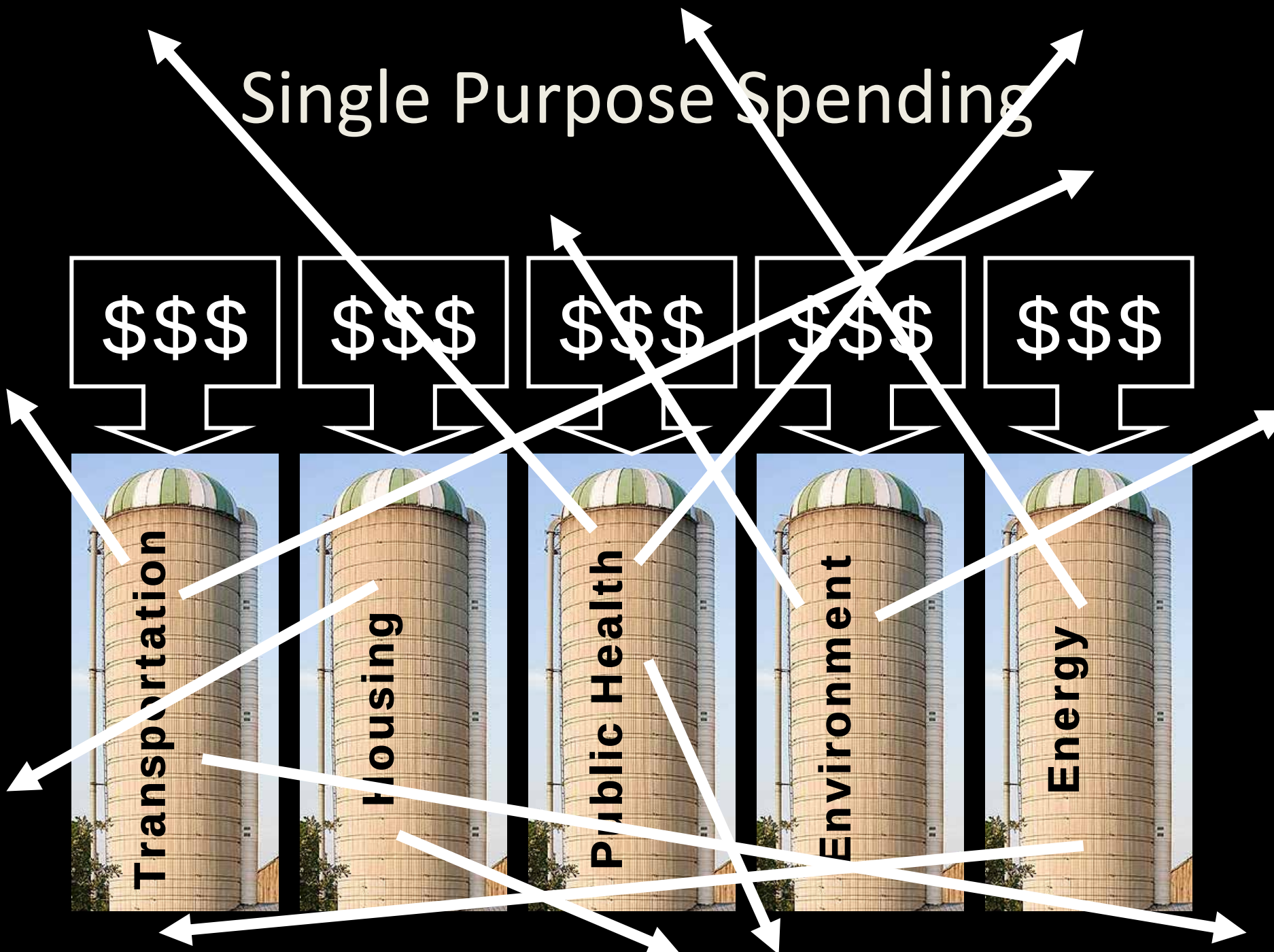
3

Livable Places

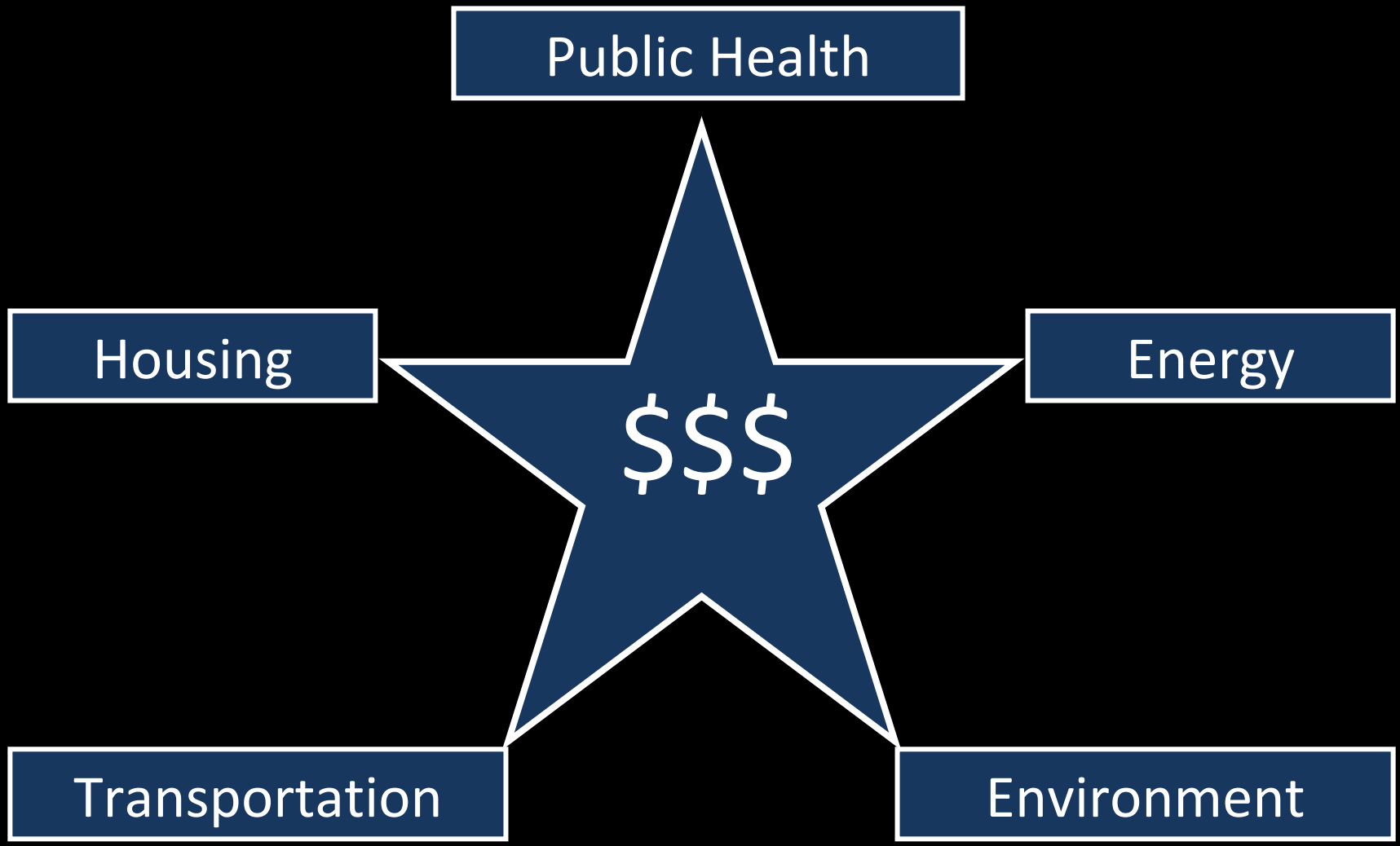
Filter: Triple Bottom Line



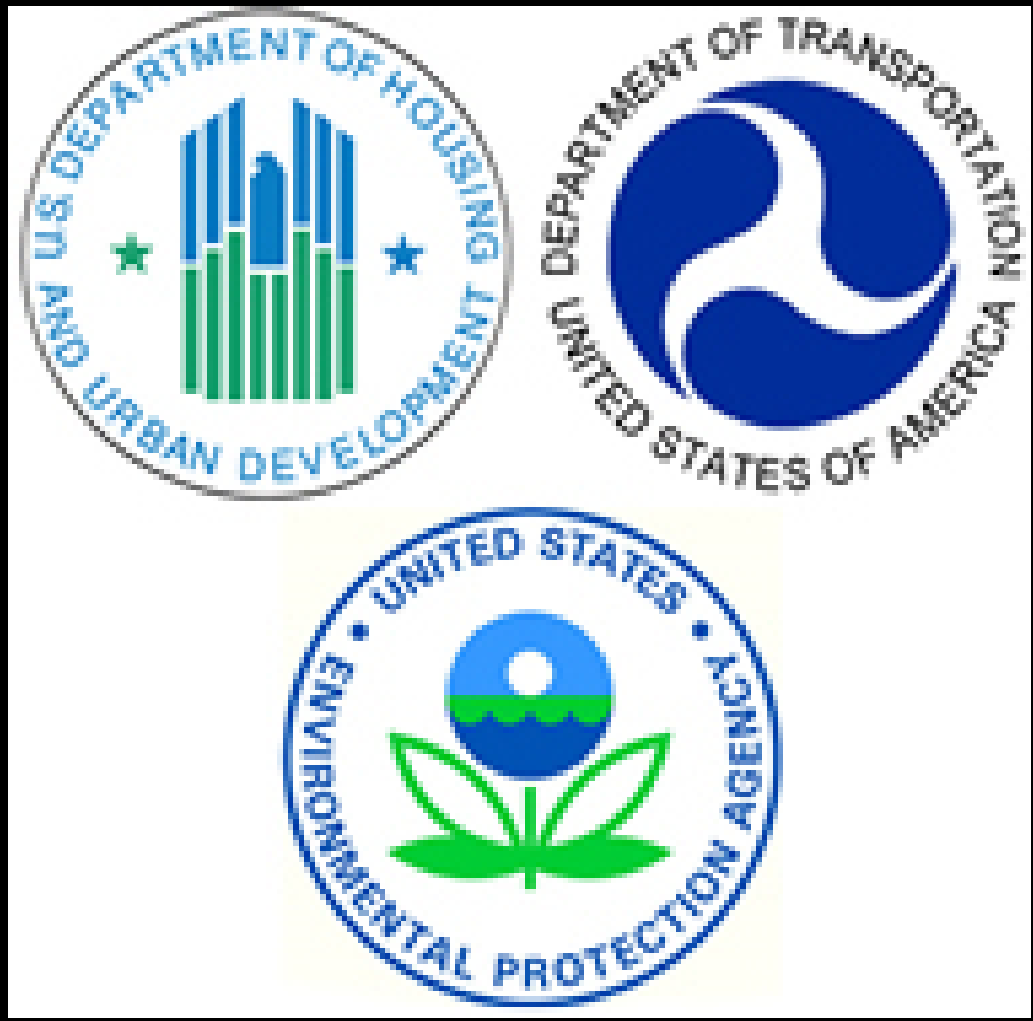
Single Purpose Spending



Integrated, Strategic Investment



Interagency Partnership for Livable Communities



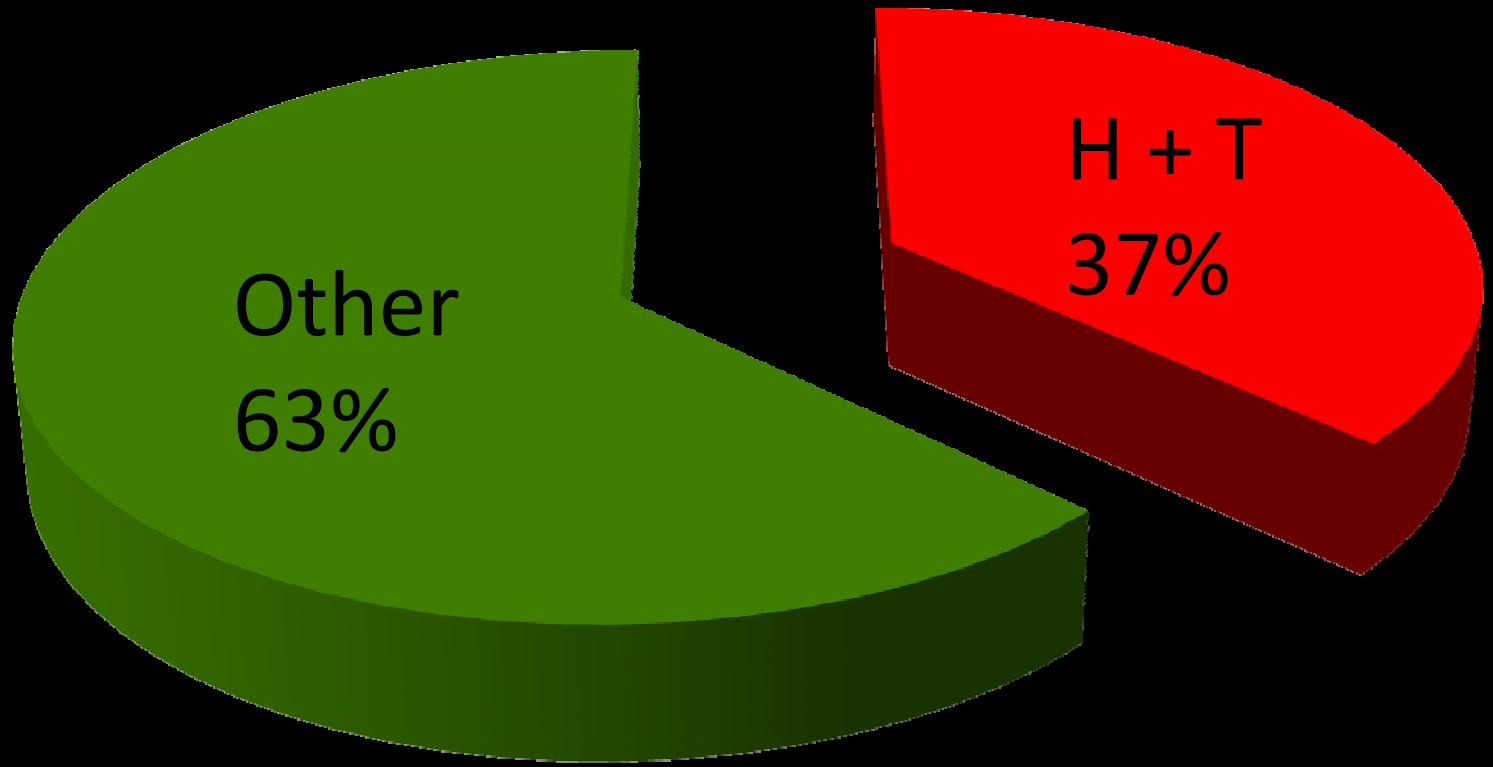
“Livable Places”

- Affordable
- Walkable
- Connected
- Complete

Affordable

Household Income: $35K - $50K

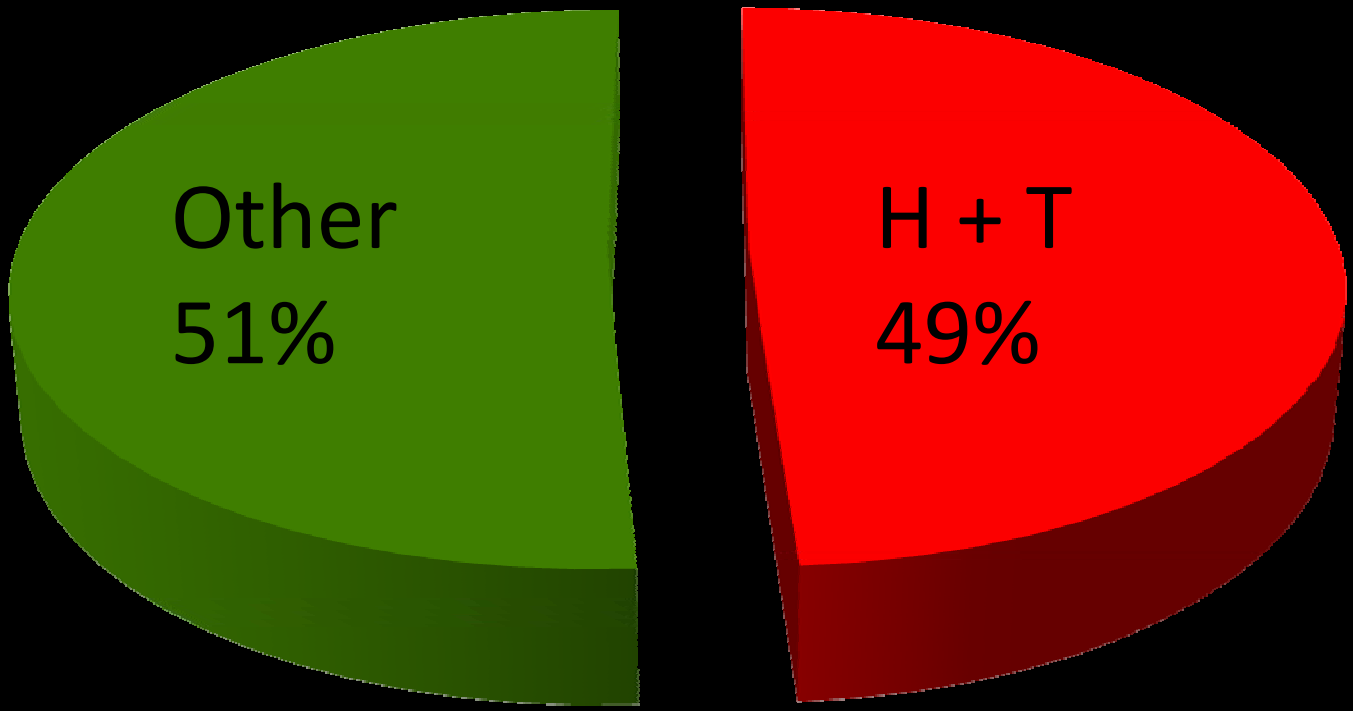
Urban



Data: Center for Neighborhood Technology

Household Income: $35K - $50K

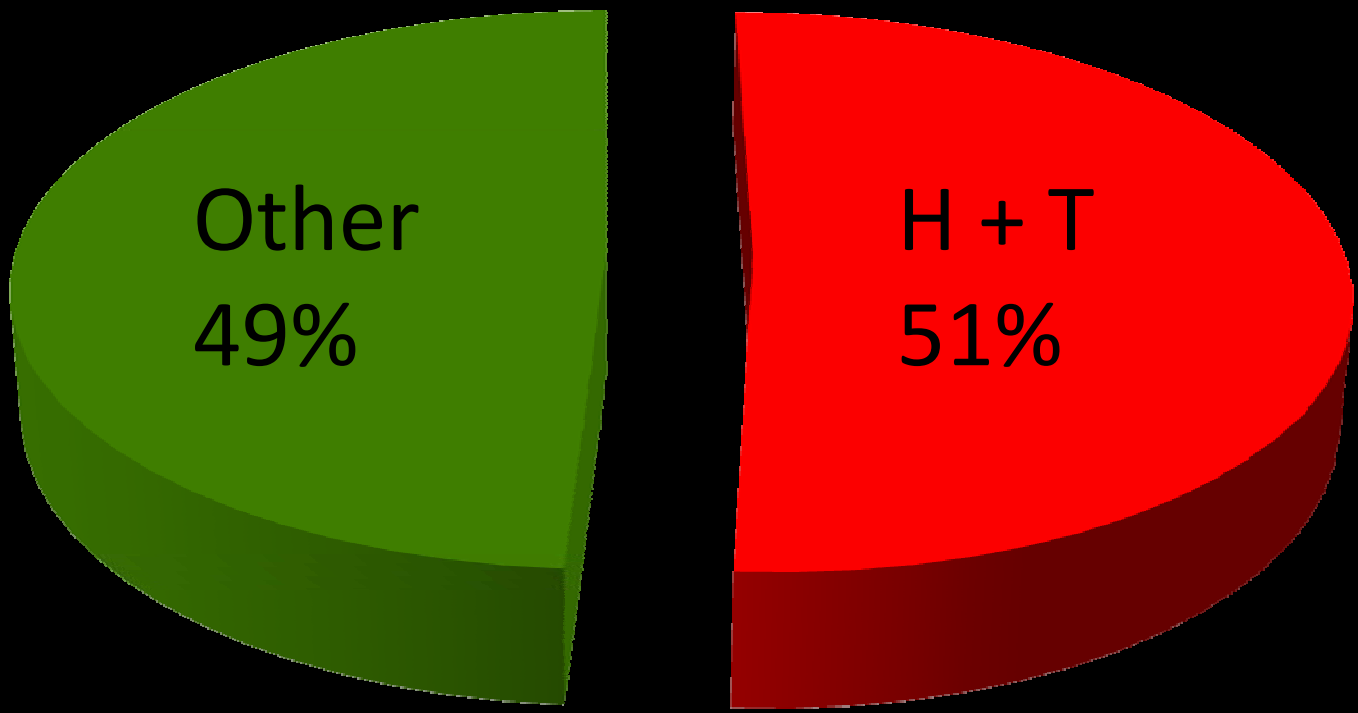
Suburban



Data: Center for Neighborhood Technology

Household Income: $35K - $50K

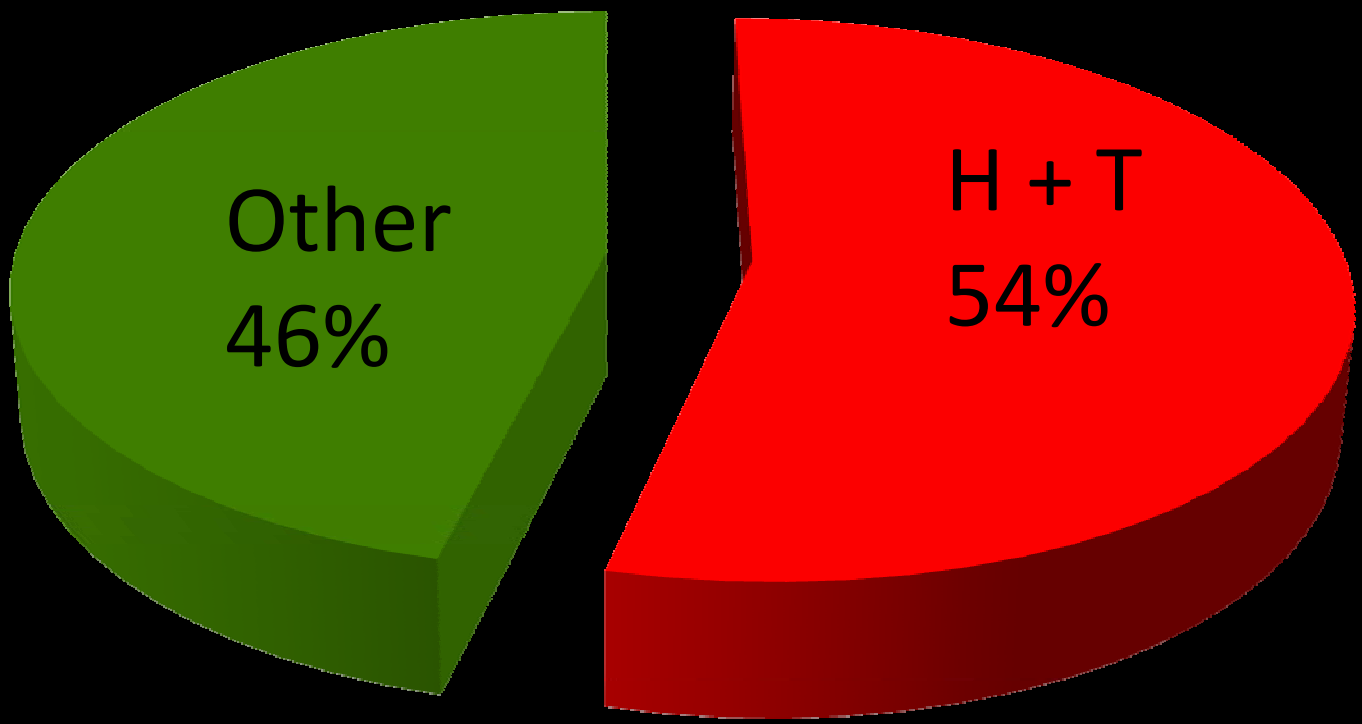
Rural



Data: Center for Neighborhood Technology

Household Income: $20K - $35K

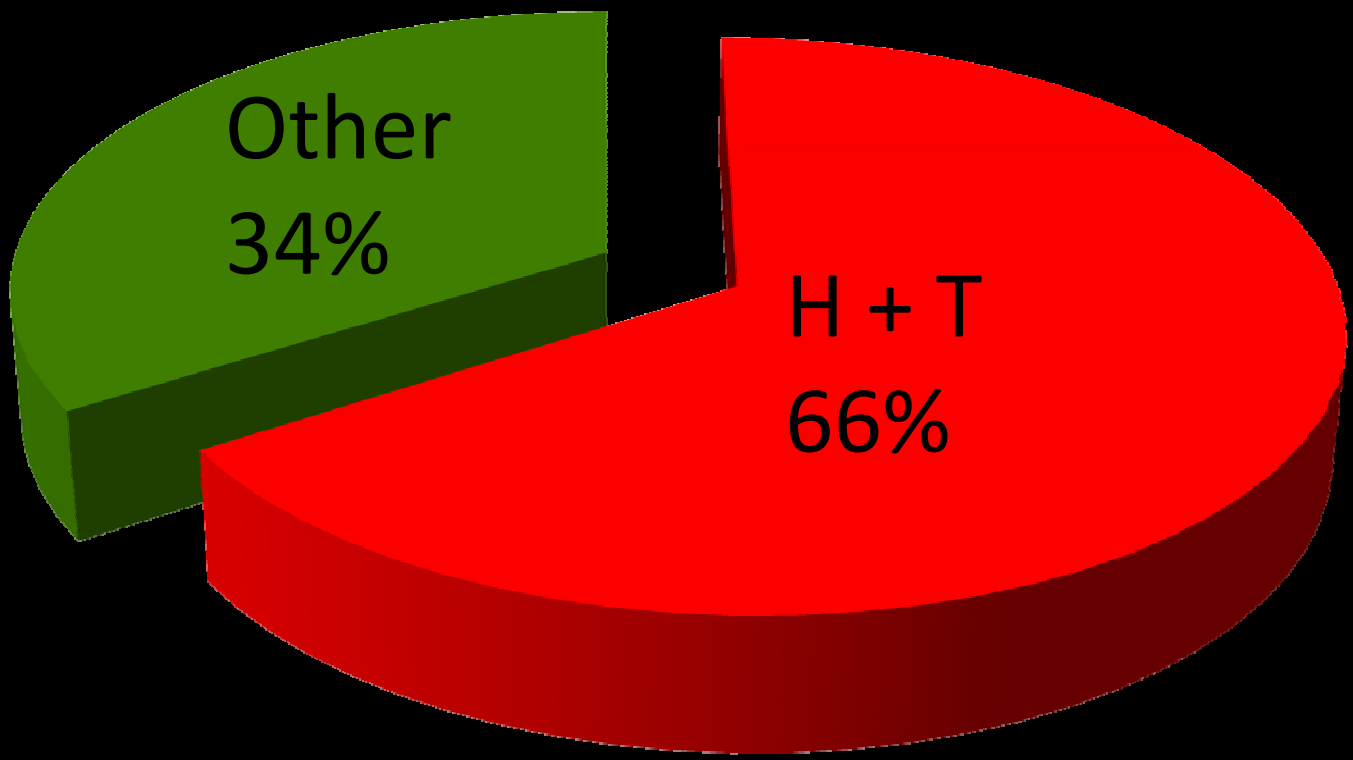
Urban



Data: Center for Neighborhood Technology

Household Income: $20K - $35K

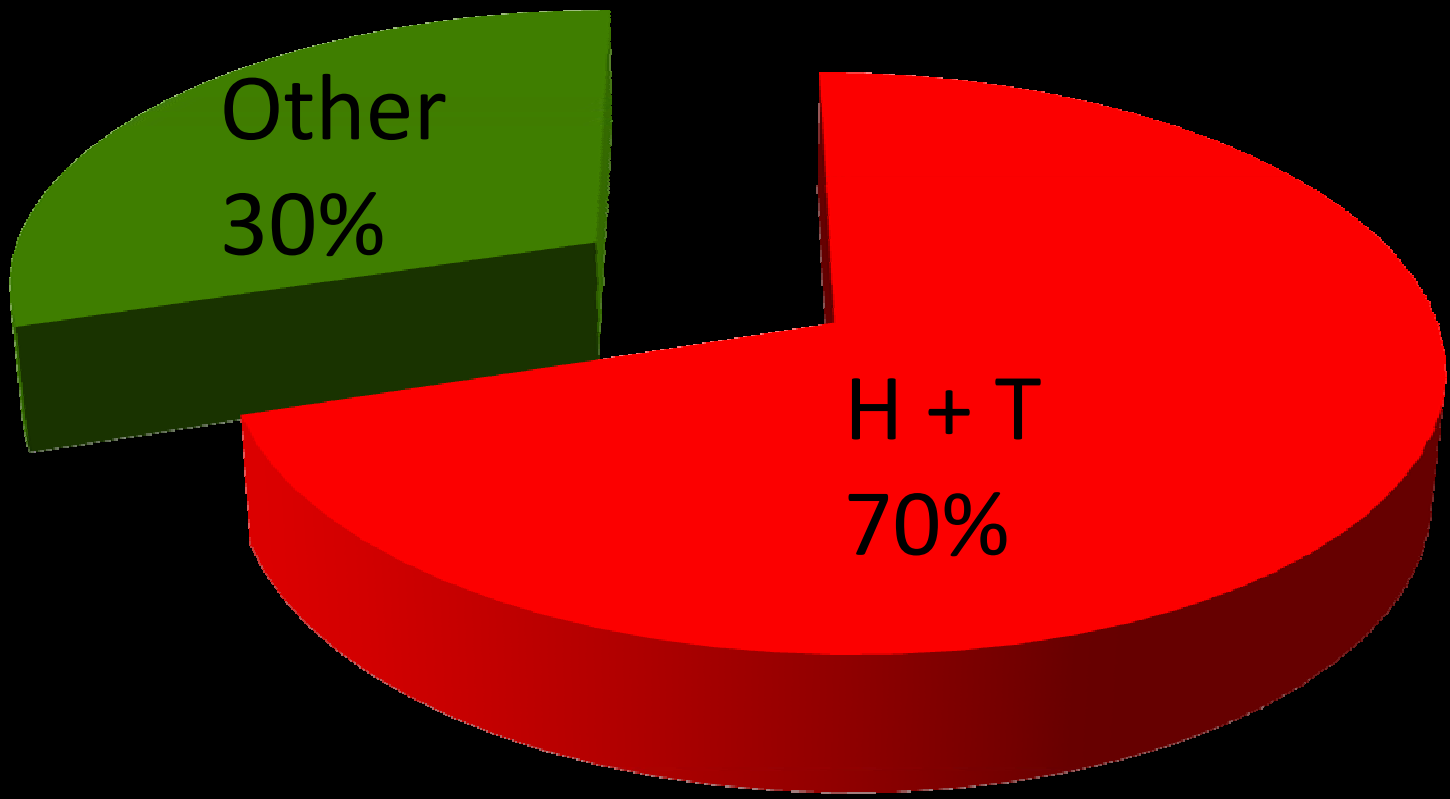
Suburban



Data: Center for Neighborhood Technology

Household Income: $20K - $35K

Rural

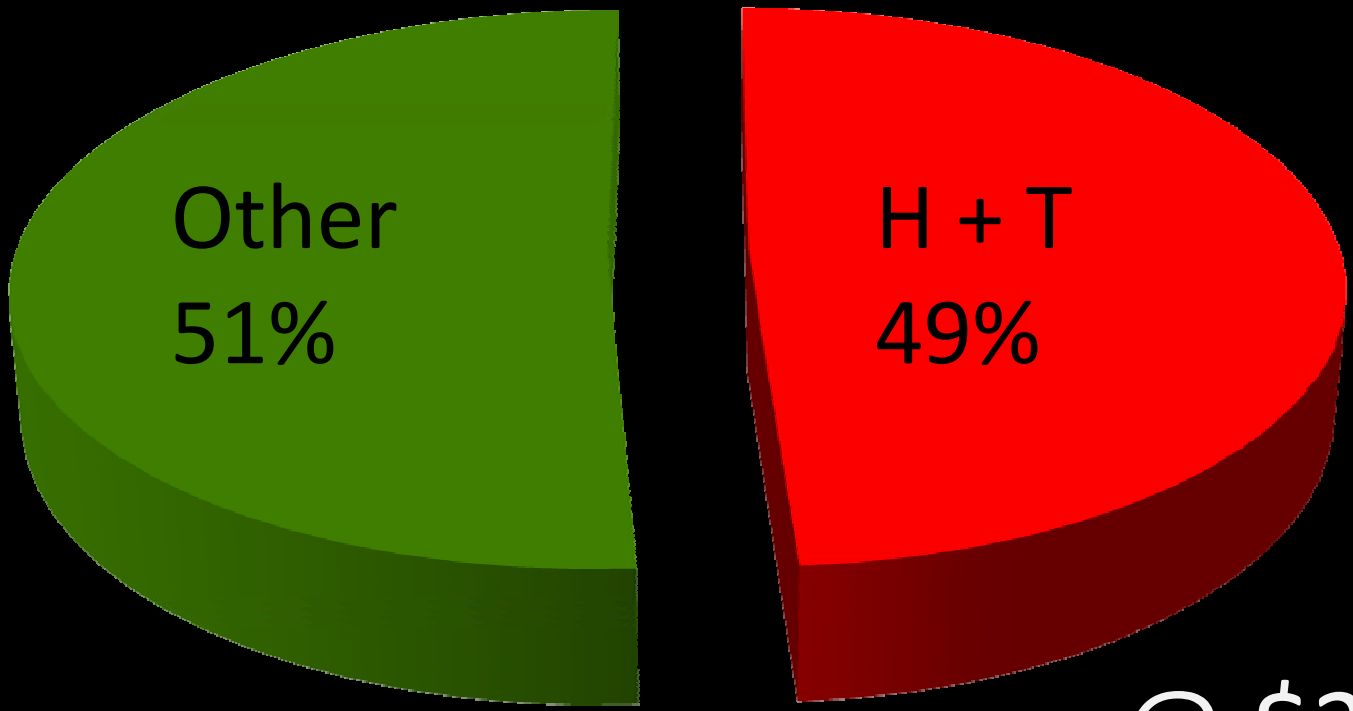


Data: Center for Neighborhood Technology

Gas @ $5.20/gallon?

Household Income: $35K - $50K

Suburban

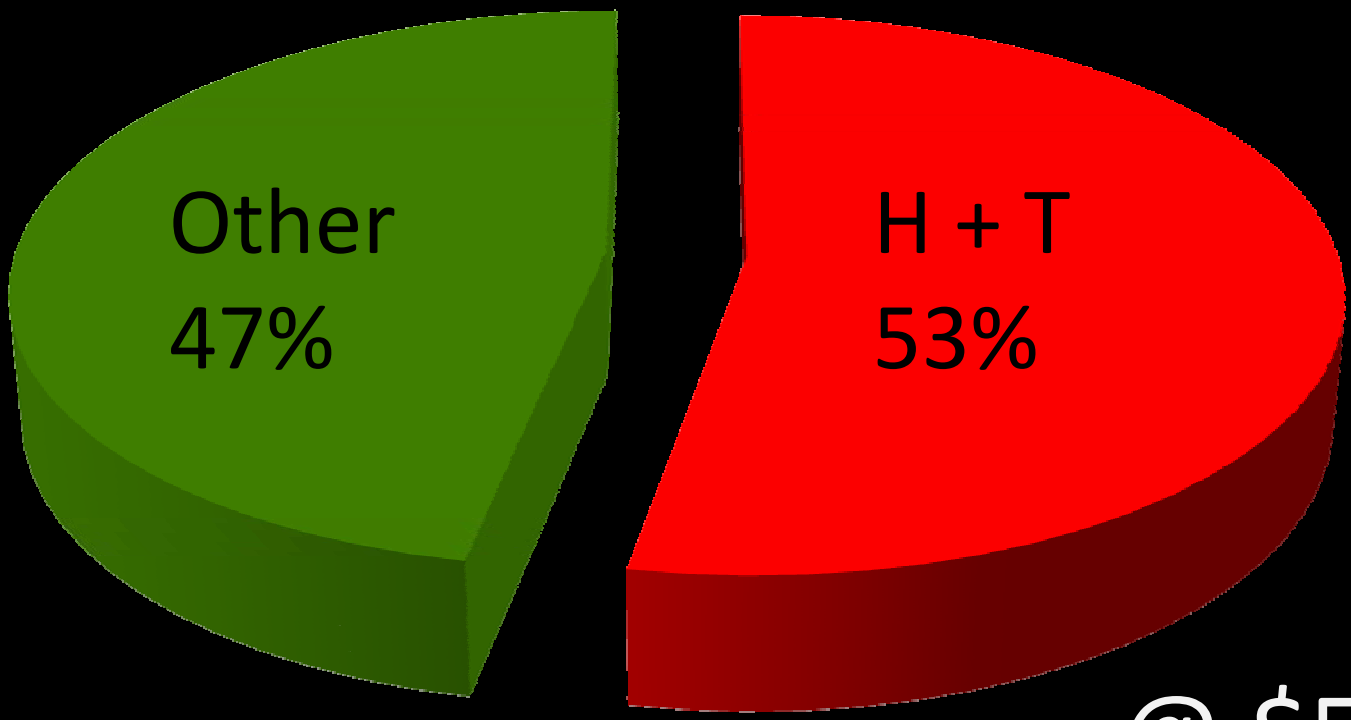


@ $2.60

Data: Center for Neighborhood Technology

Household Income: $35K - $50K

Suburban

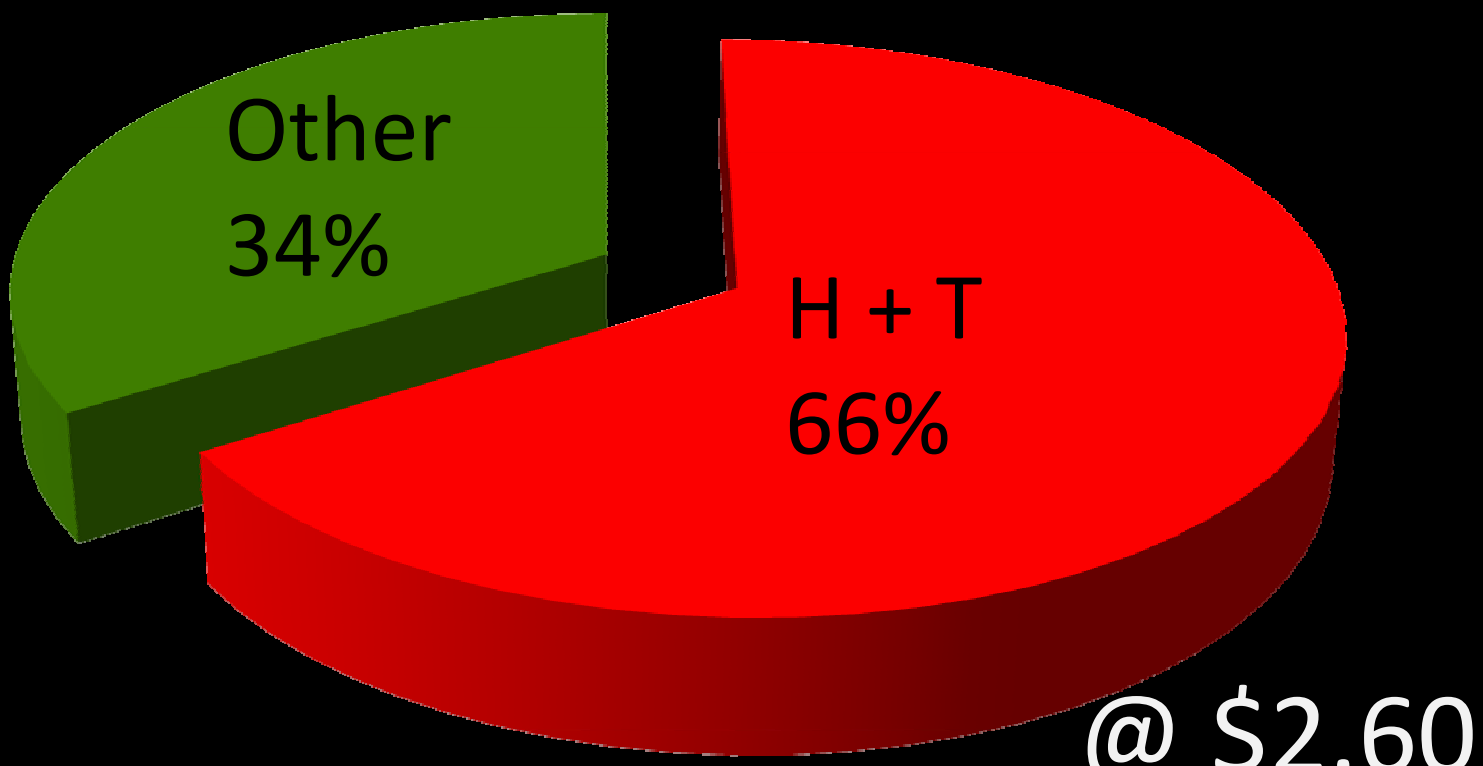


@ $5.20

Data: Center for Neighborhood Technology

Household Income: $20K - $35K

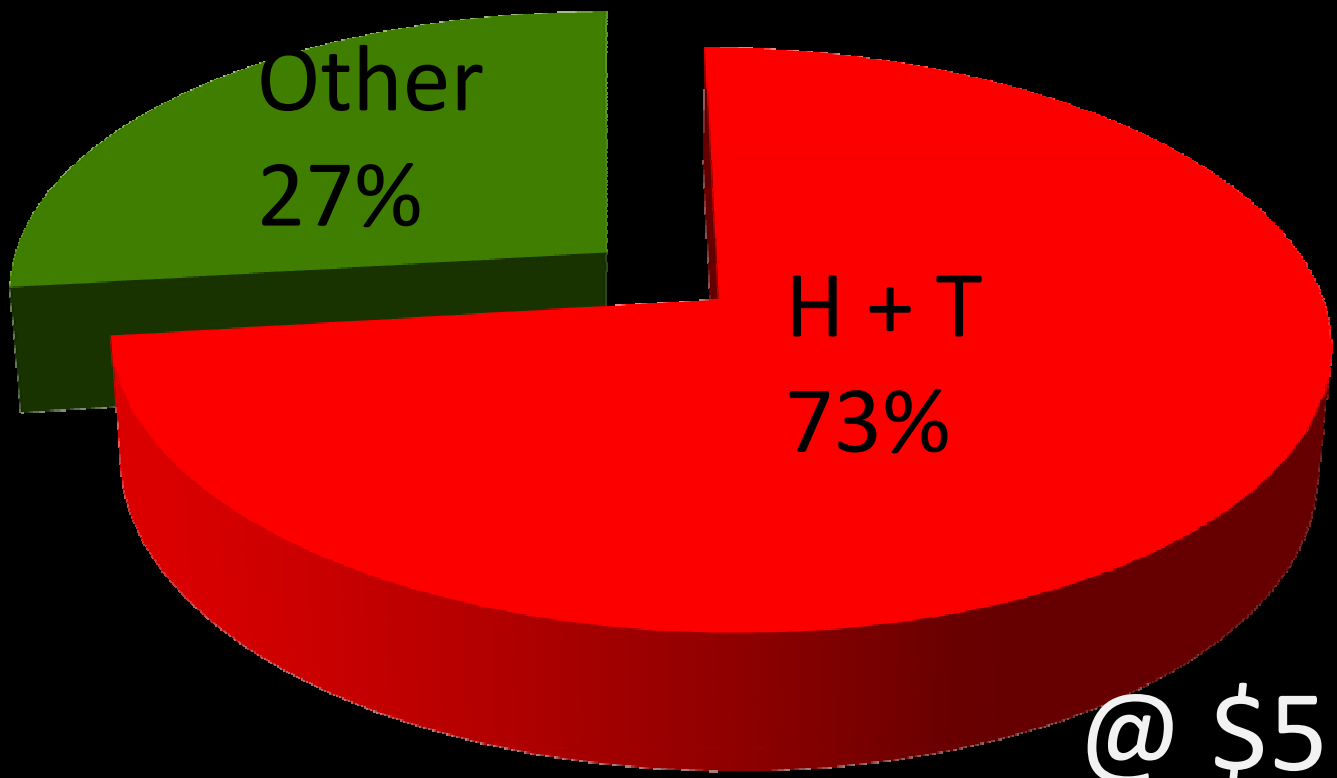
Suburban



Data: Center for Neighborhood Technology

Household Income: $20K - $35K

Suburban



@ $5.20

Data: Center for Neighborhood Technology

Walkable

76 million seniors

78 million millennials

two largest generations, same housing market:

mixed-use, transit-served, walkable neighborhoods


SPEED
LIMIT
45


Boulder

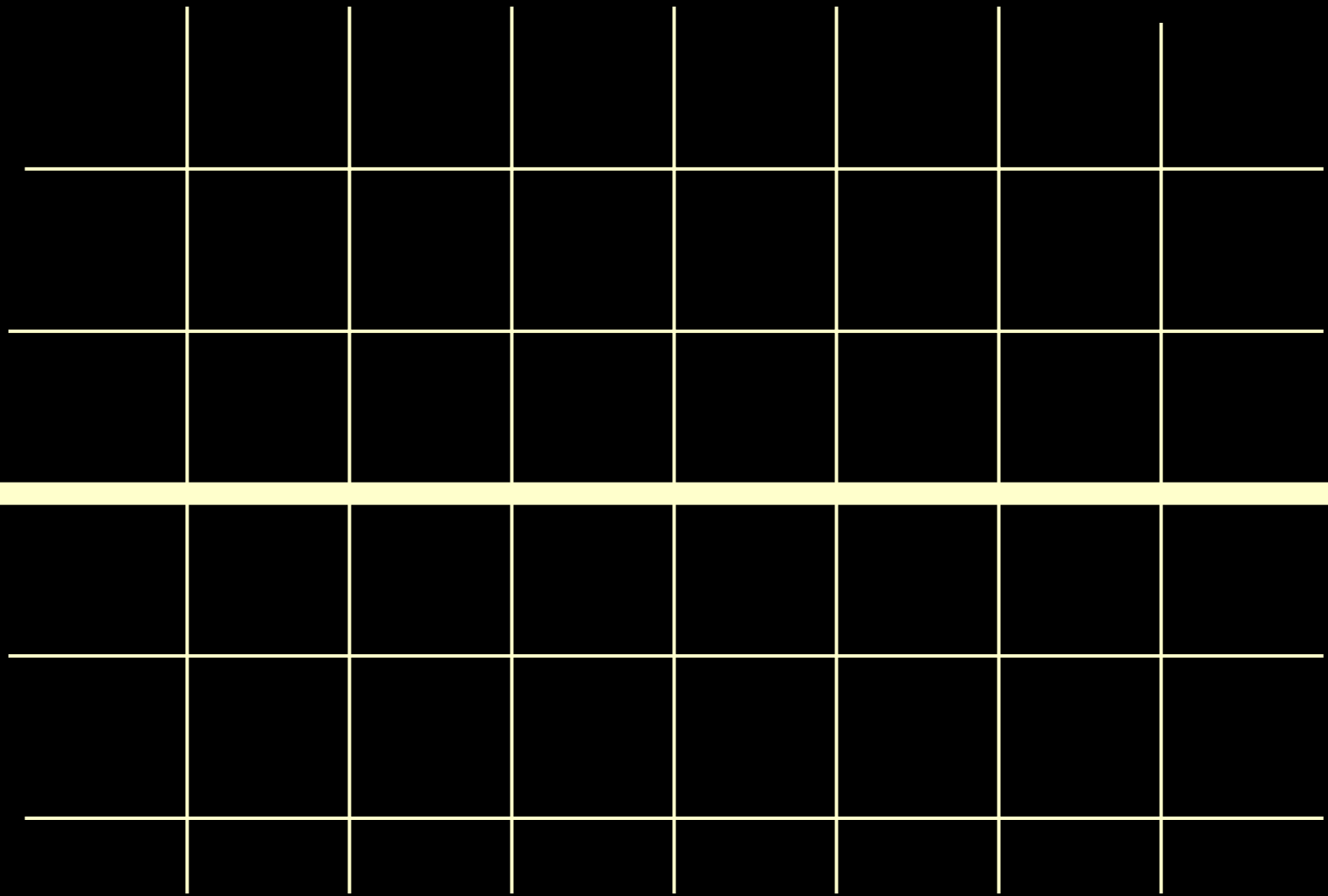

Boulder

Connected

Windsor, CO – Old Town

Windsor, CO – after 1990

optimum block size for efficient traffic flow



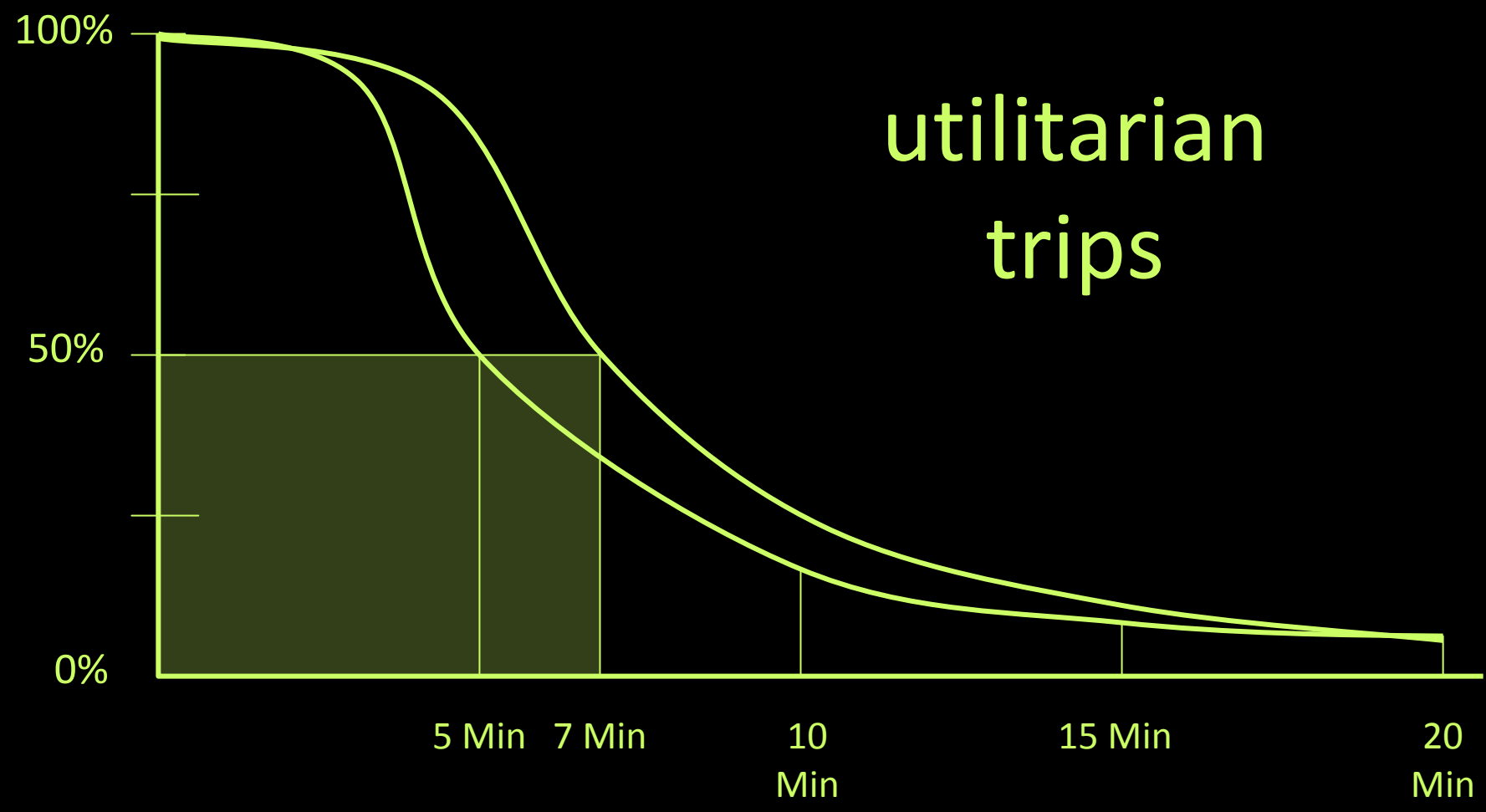
330’ to 528’

common connectivity standards

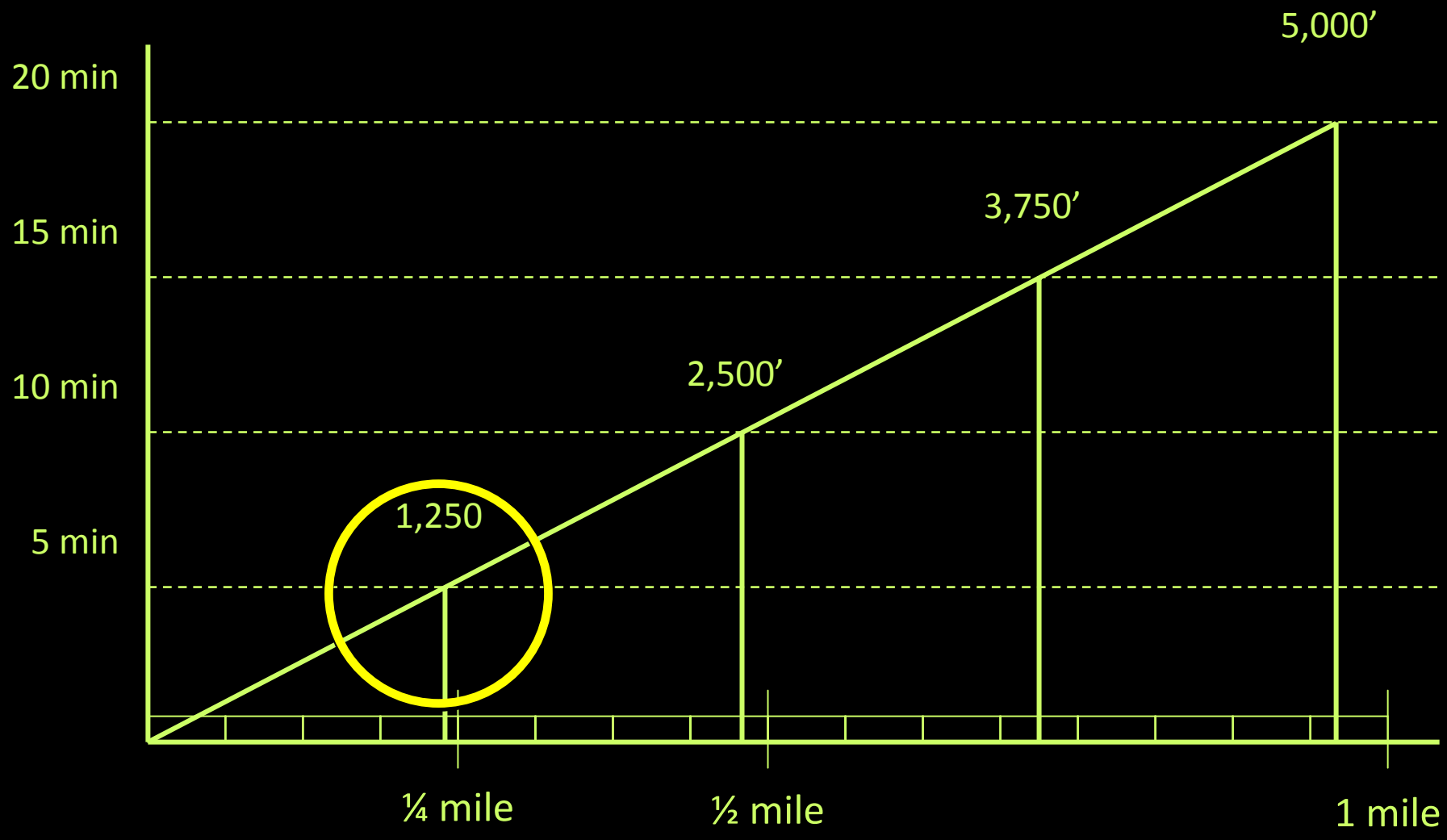
- intersections/square mile (min 200)
- maximum block perimeter (1400’ – 1800’)
- block length (330’ – 528’)
- links/nodes

good connectivity also expands the range of walking trips, increasing pedestrian activity

walk propensity



walk distances @ 250 fpm



path index

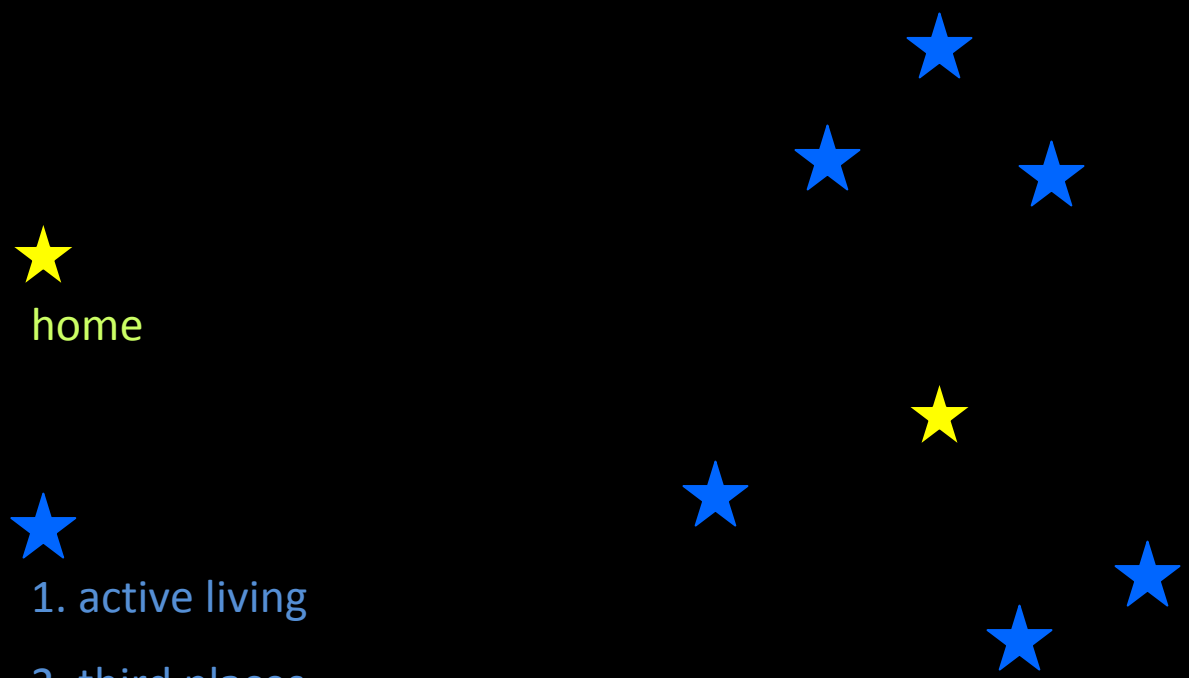
shortest feasible route on streets & trails

÷

straight line distance (as the crow flies)


2100 feet
500 feet
Path Index: 4.2

5 – 7 minute walk

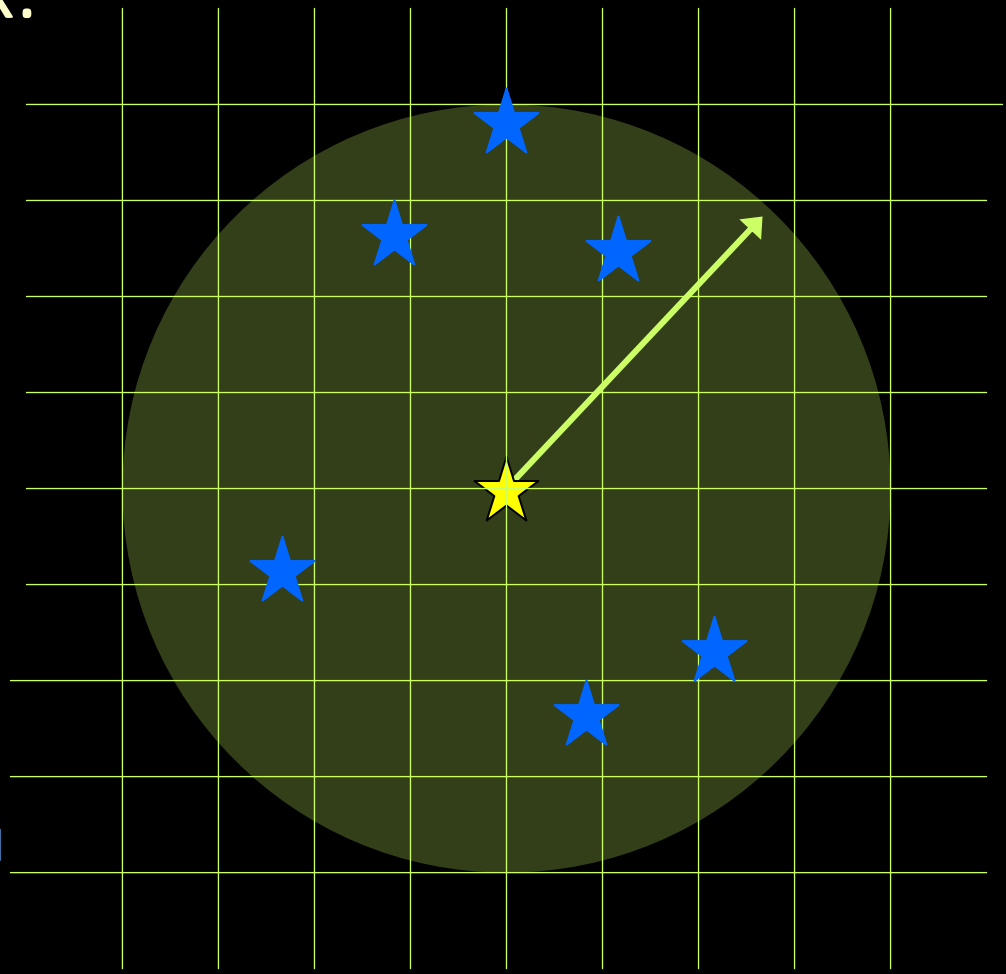


home

1. active living
2. third places
3. convenience retail

5 – 7 minute walk

path index:
1.4



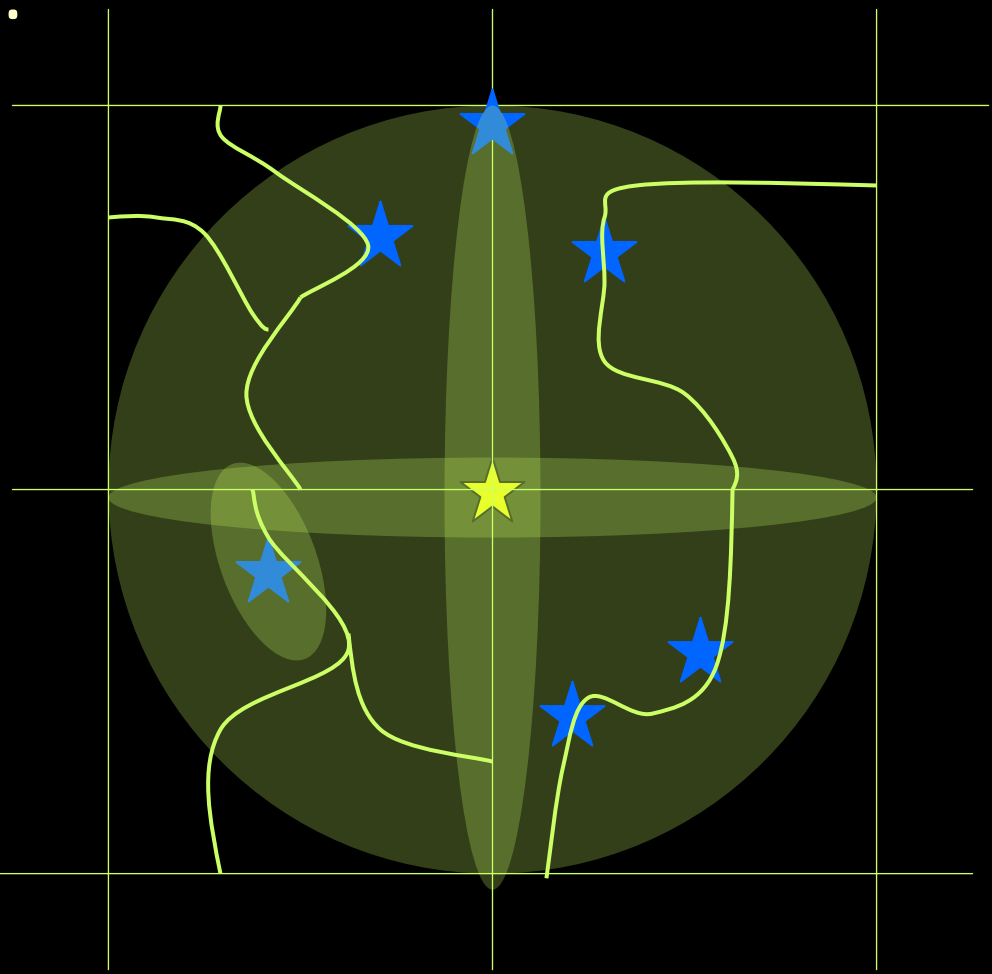
home

1. active living
2. third places
3. convenience retail

¼ mile

5 – 7 minute walk

path index:
4.5

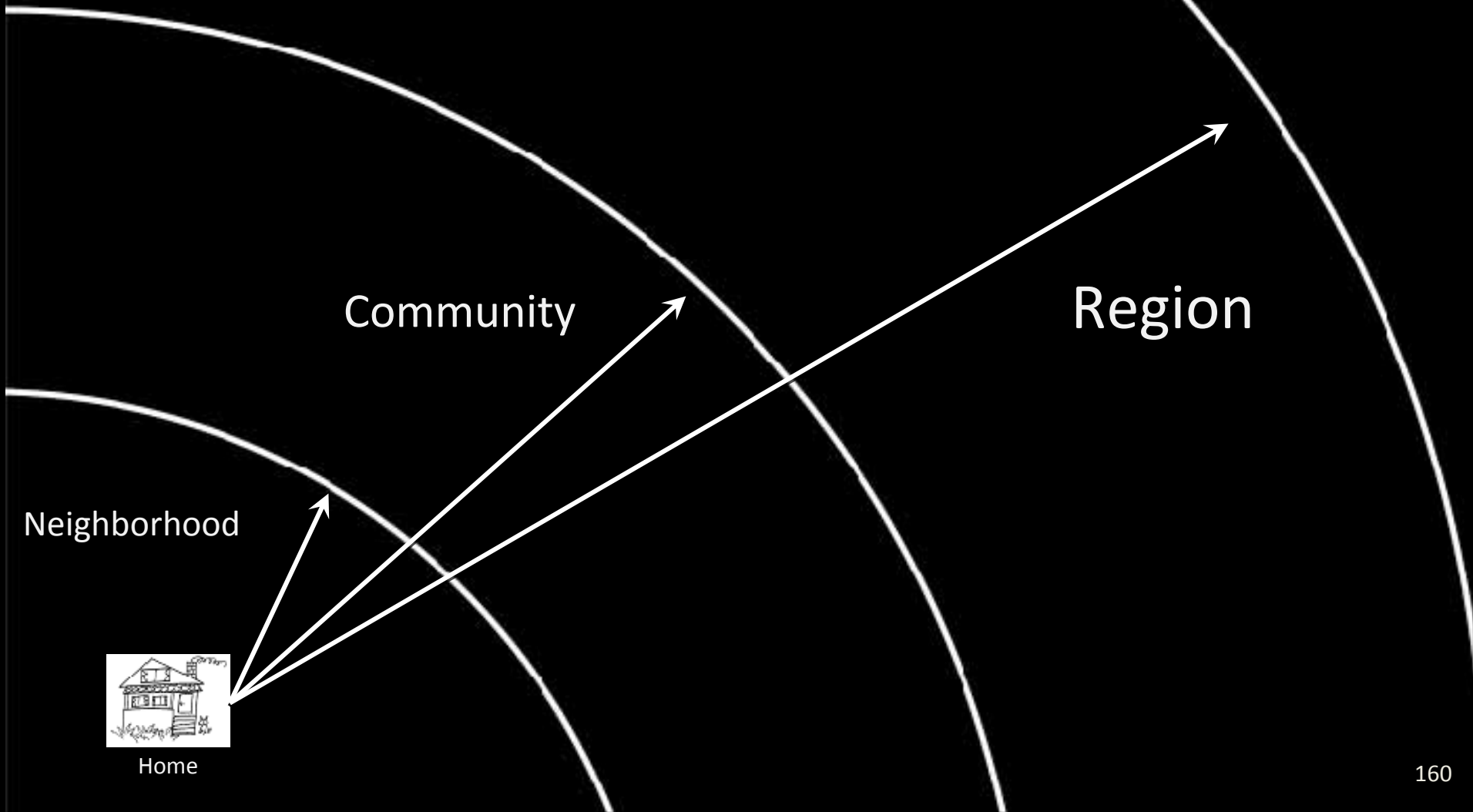


home

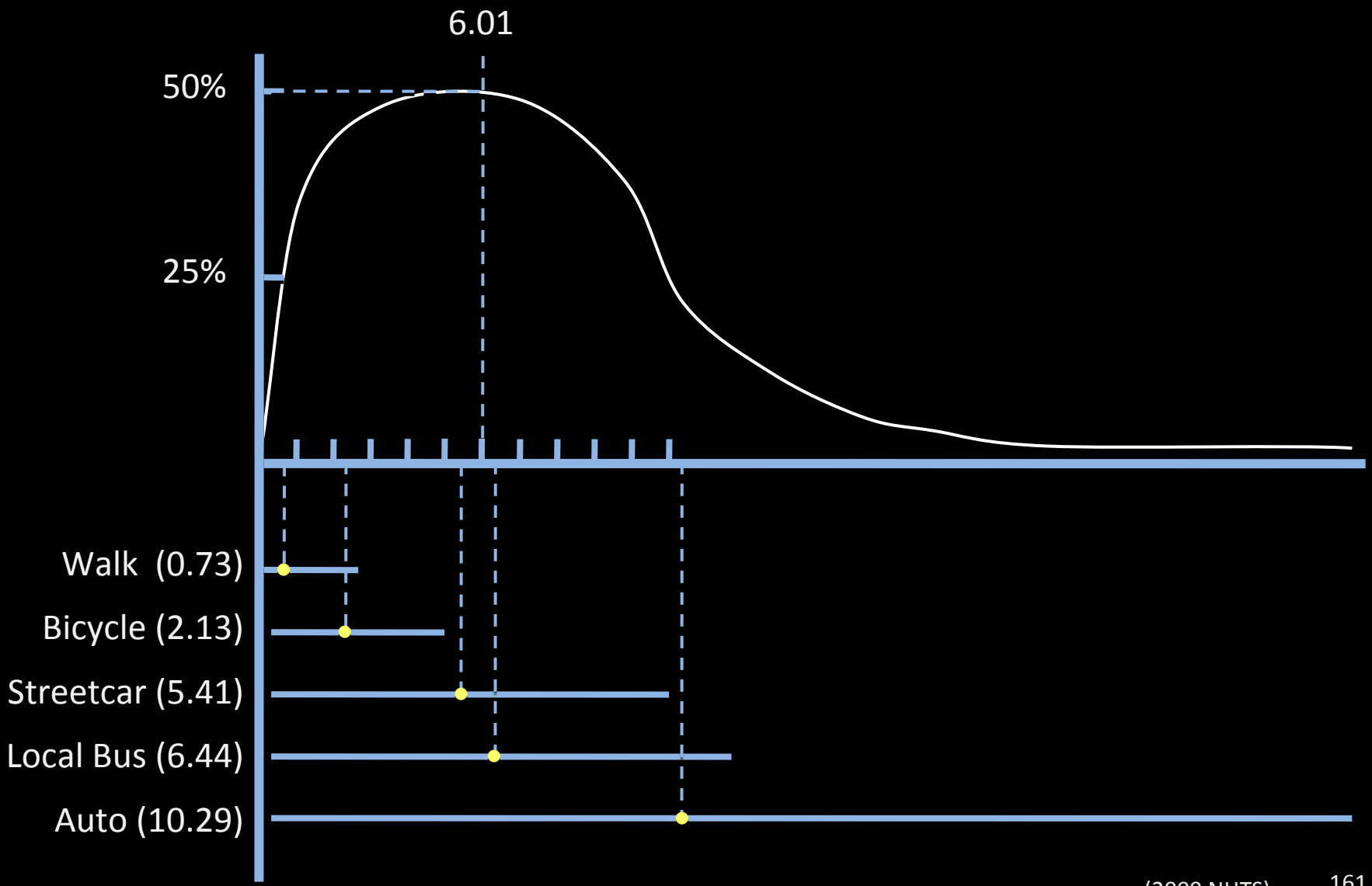
1. active living
2. third places
3. convenience retail

Complete

Spatial Relationships

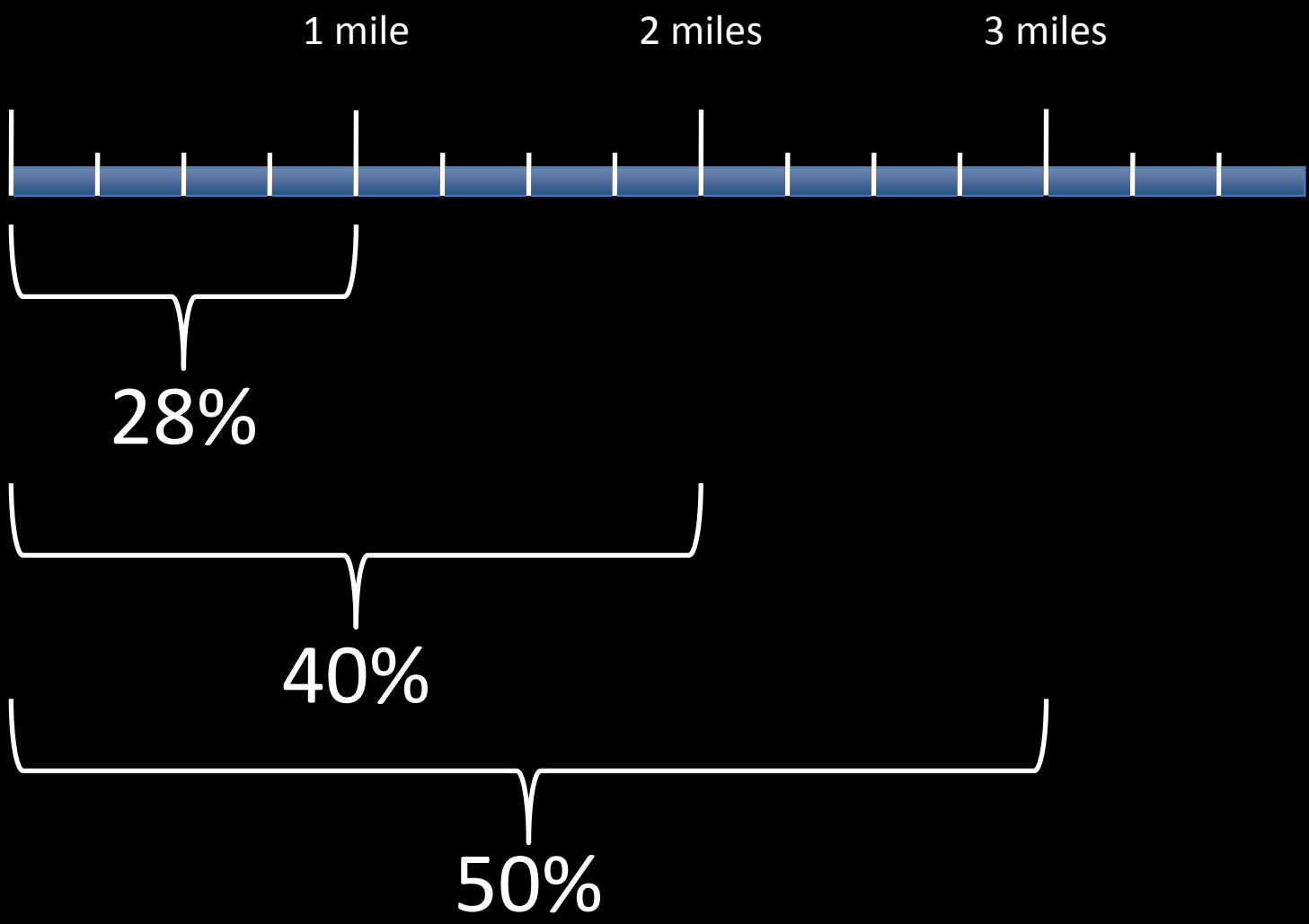


Average Trip Lengths



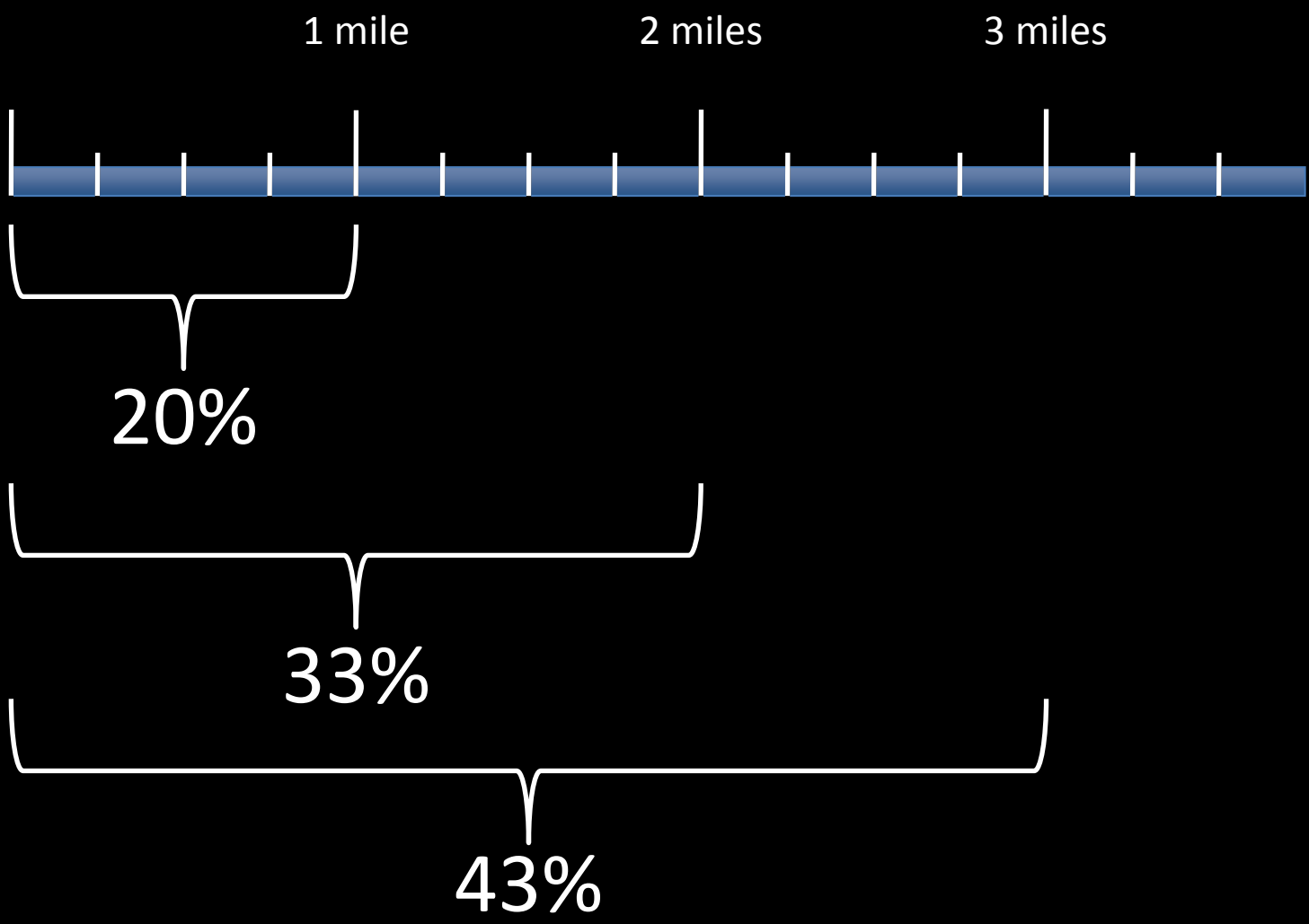
(2009 NHTS)

Trip Length – All Trips



(2009 NHTS)

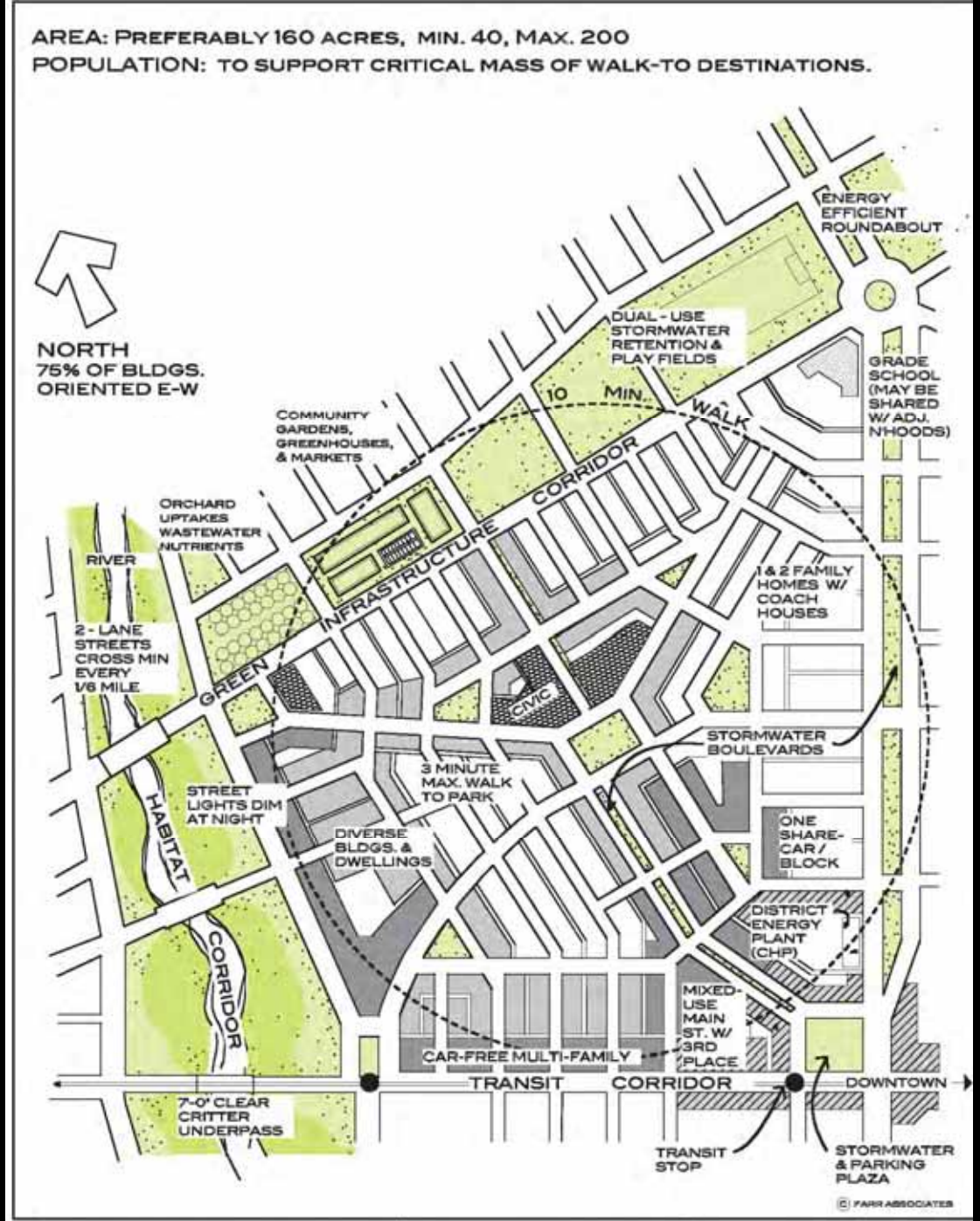
Trip Length – Driving Trips



(2009 NHTS)

the neighborhood

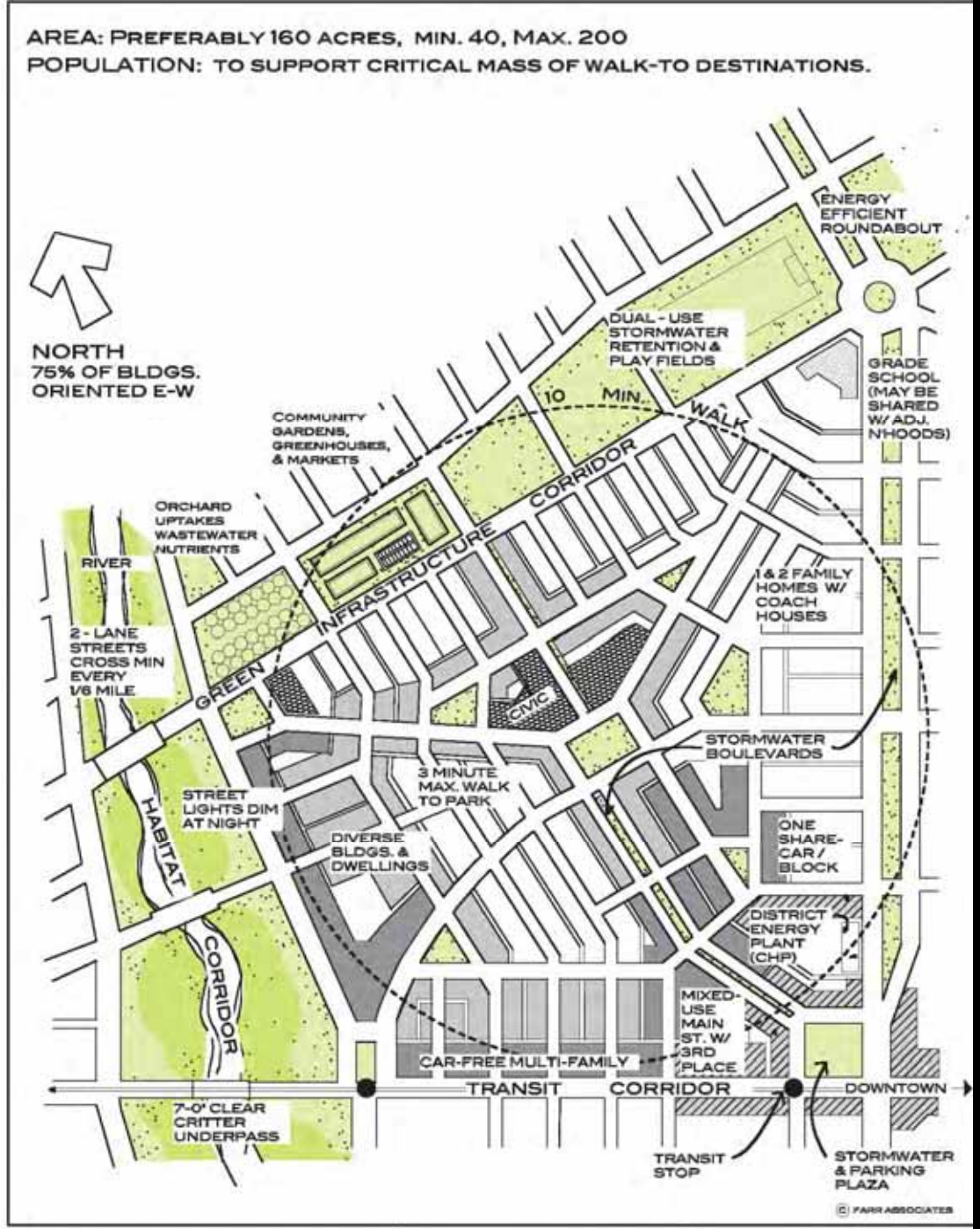
- ¼ mile radius
- 160 – 200 acres



Graphic: Doug Farr, Sustainable Urbanism

the complete neighborhood

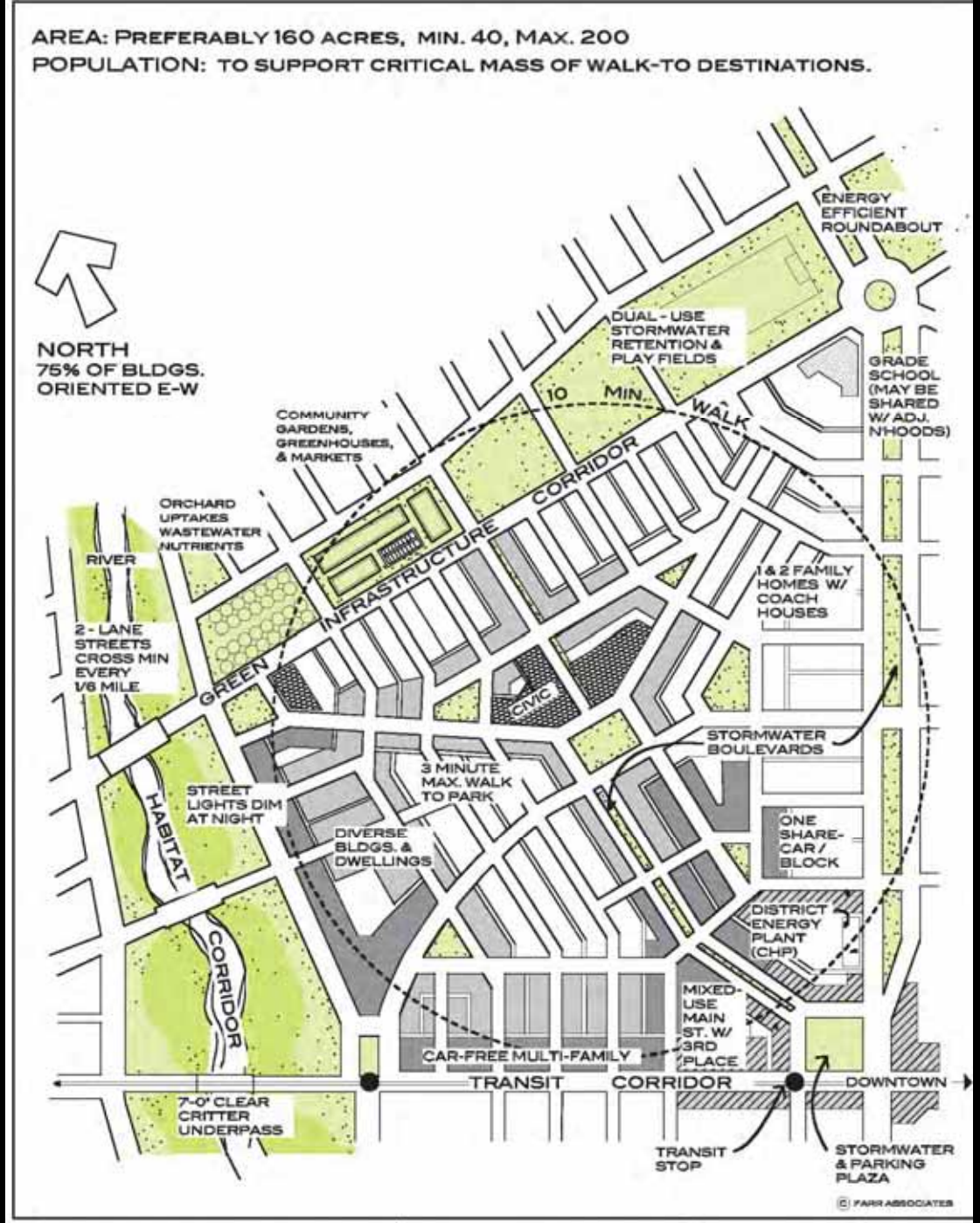
- schools
- local retail
- services
- parks
- diverse housing
- transit



Graphic: Doug Farr, Sustainable Urbanism

the complete neighborhood

- walkable
- mixed-use
- transit-served



Graphic: Doug Farr, Sustainable Urbanism

Household Needs

1. active living
2. third places
3. convenience retail
4. provisions & services
5. family
6. shopping
7. medical
8. cultural

destinations

	daily	weekly	monthly
1. active living	X		
2. third places	X		
3. convenience	X		
4. provisions		X	
5. family		X	
6. shopping		X	
7. medical			X
8. cultural			X

destinations

	daily	weekly	monthly
1. active living	X		
2. third places	X		
3. convenience	X		
4. provisions		X	
5. family		X	
6. shopping		X	
7. medical			X
8. cultural			X

should be within walking distance

destinations

	daily	weekly	monthly
1. active living	X		
2. third places	X		
3. convenience	X		
4. provisions		X	
5. family		X	
6. shopping		X	
7. medical			X
8. cultural			X

accessible by walking and fixed route transit

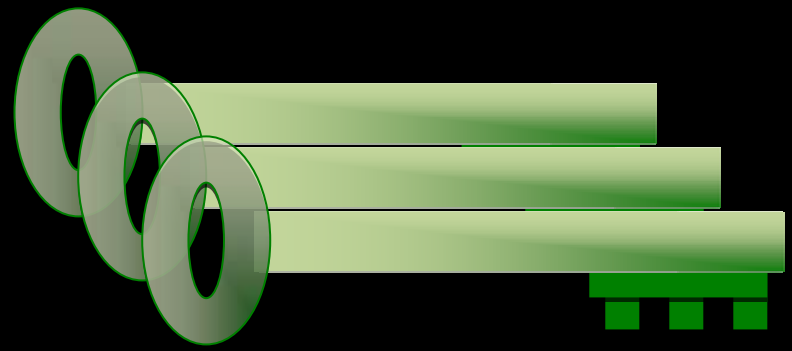
Portland “20-minute neighborhood”

BOTTOM LINE:

Livable places are affordable, walkable, connected and complete. They are the market for new development.

wrap up

3 Keys



Transportation and the Future

1

Energy

Petroleum Dependency

BOTTOM LINE:

We are entering the Post Petroleum Era, ready or not.

2

Public Health

Transportation & Public Health

Traffic Safety + Personal Health

BOTTOM LINE:

Public health is becoming a huge factor in our economy and is directly affected by our transportation choices.

3

Livable Places

BOTTOM LINE:

Livable places are affordable, walkable, connected and complete. They are the market for new development.

It’s Not
Your Father’s Transportation Program


Sustainability
Climate Change
Smart Growth
Opportunity!
Recession
Energy
Public Health
Safety
Congestion

Thank You

www.charlier.org