

Presenter



Richard Jackson, MD, MPH

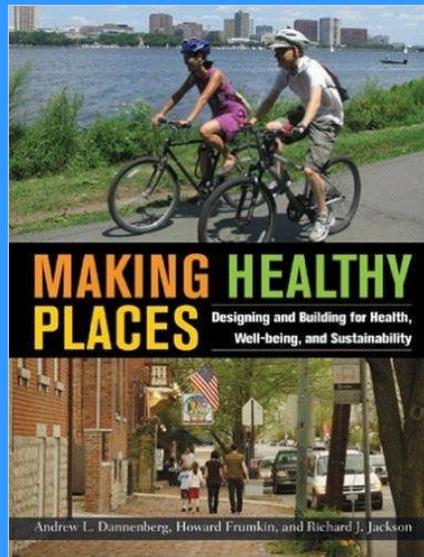
Professor, Fielding School of Public Health
University of California, Los Angeles



DESIGNING HEALTHY COMMUNITIES



RICHARD J. JACKSON WITH STACY SINCLAIR



Climate Change, Transportation and Healthy Community Design

Richard J Jackson MD MPH

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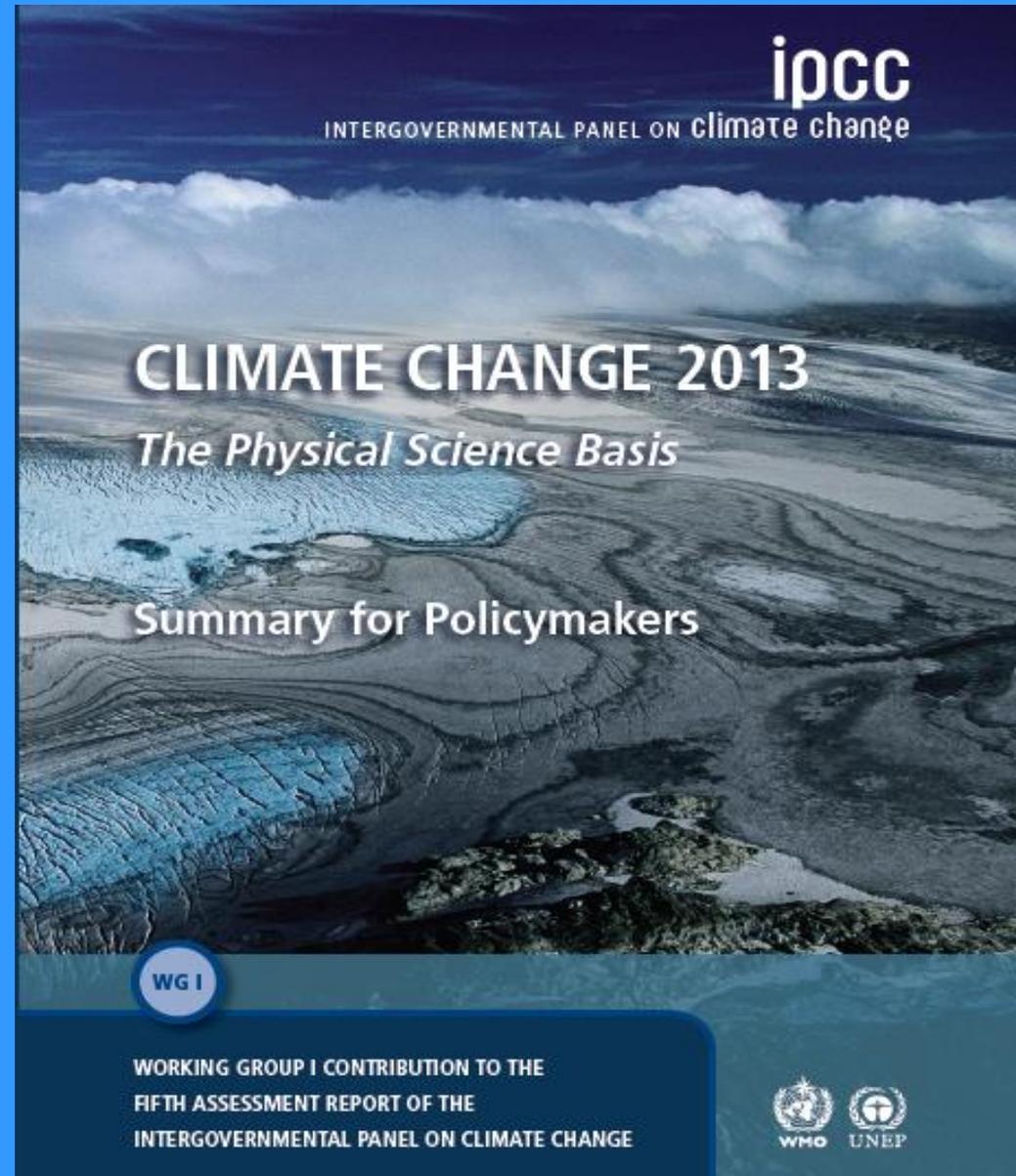
UCLA Fielding School of Public Health



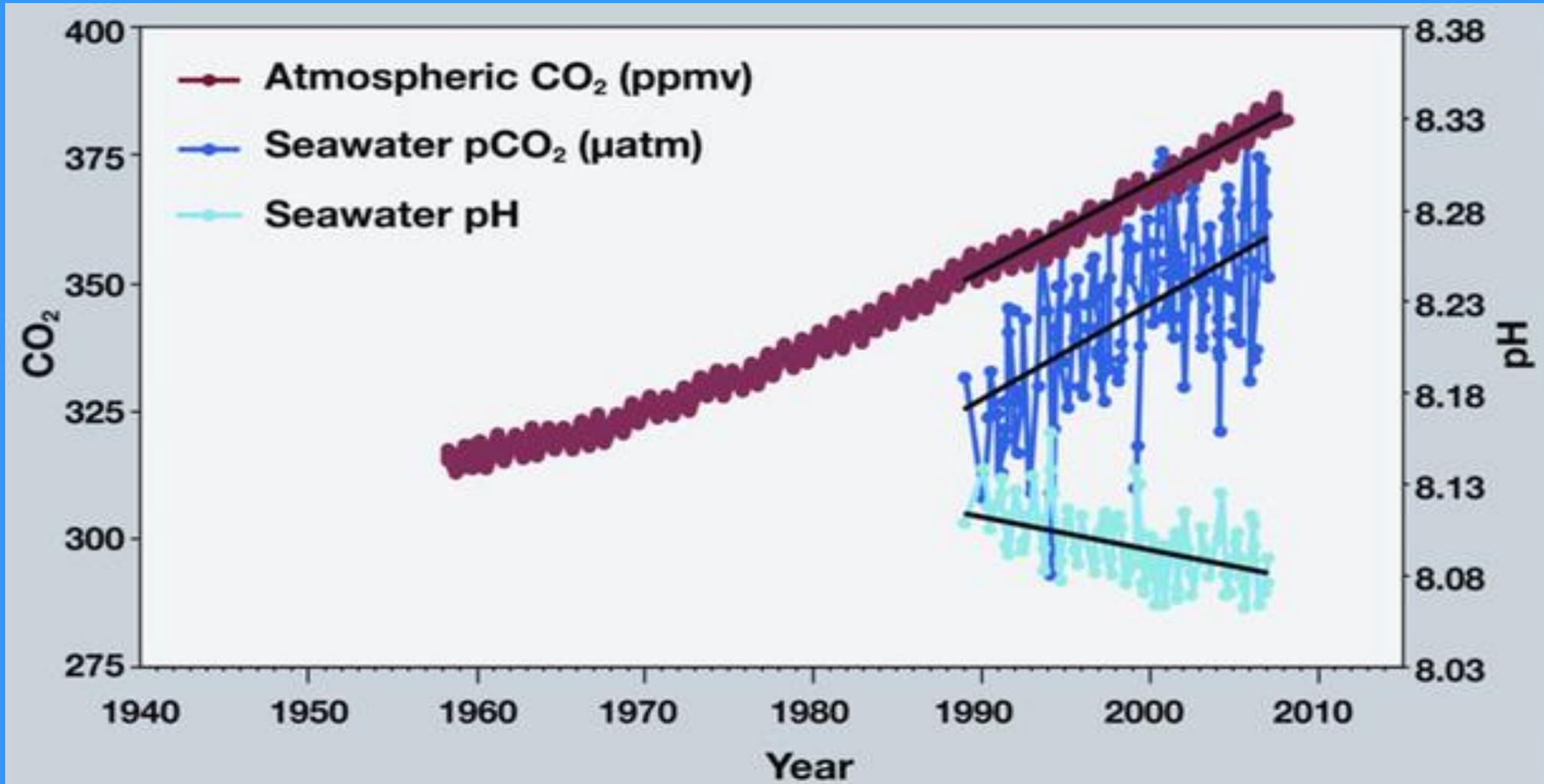
THE IMPACTS OF CLIMATE CHANGE ON
HUMAN HEALTH
IN THE UNITED STATES

A Scientific Assessment

- Projected Sea Level Rise of 0.5 to 1.0 meter by year 2100



Change in Atmosphere and Seawater CO₂ and Seawater pH



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NATURE | ARTICLE 🔗 📄

日本語要約

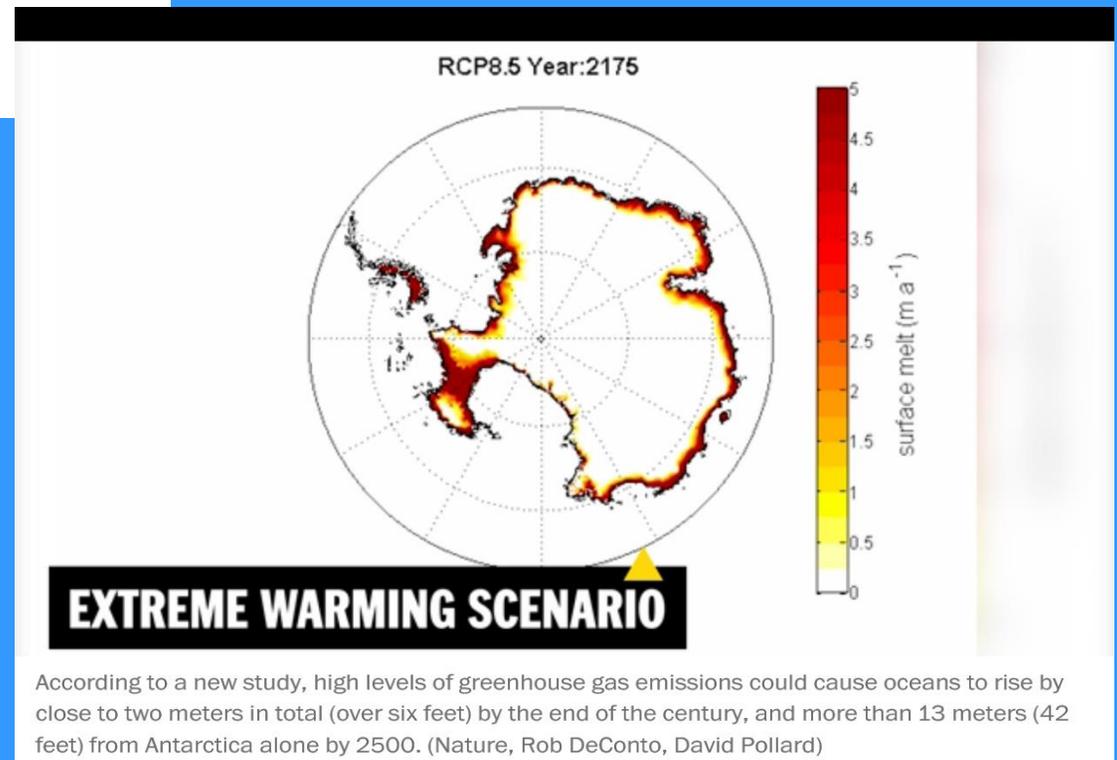
Contribution of Antarctica to past and future sea-level rise

Robert M. DeConto & David Pollard

[Affiliations](#) | [Contributions](#) | [Corresponding author](#)

Projected Sea Level Rise of 1- 2 meters by year 2100

Publication in Nature
March 2016



Climate Change Is the ‘Mother of All Risks’ to National Security

Jon Powers | Nov. 6, 2015



IDEAS *Jon Powers, an Iraq Veteran, served as the Federal Chief Sustainability Officer and Special Advisor on Energy to the US Army in the Obama Administration, and is currently Managing Director of Public Sector Business Development with Bloom Energy.*

A strong global climate agreement in Paris would help build a safer America

Serving at Pentagon, I worked with leaders who studied threats ranging from insurgent

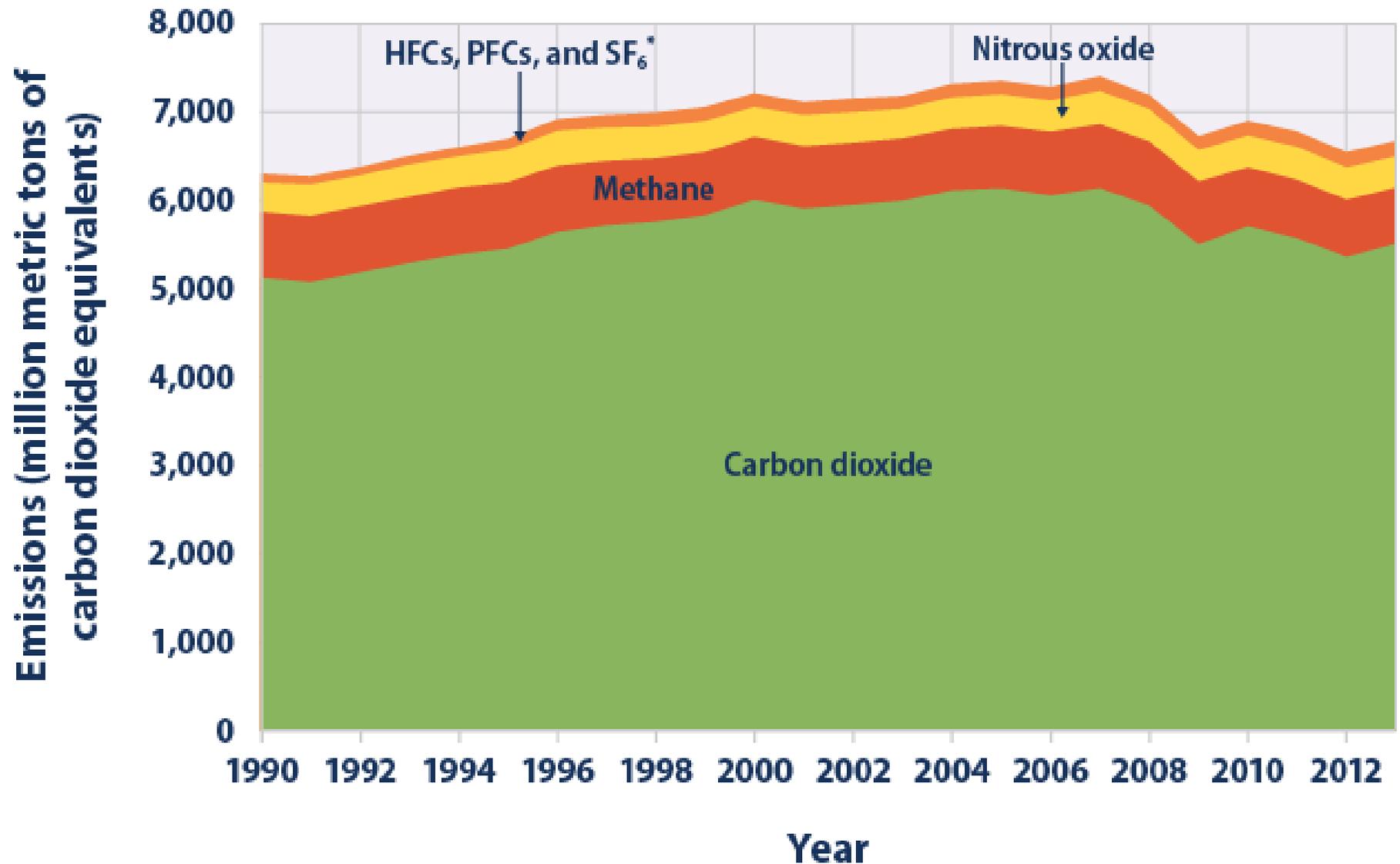


Mark Ralston—AFP/Getty Images

Boat docks sit empty on dry land, as Folsom Lake reservoir near Sacramento stands at only 18 percent capacity, as severe drought continues in California on Sept. 17, 2015.

US Climate Forcing Gases

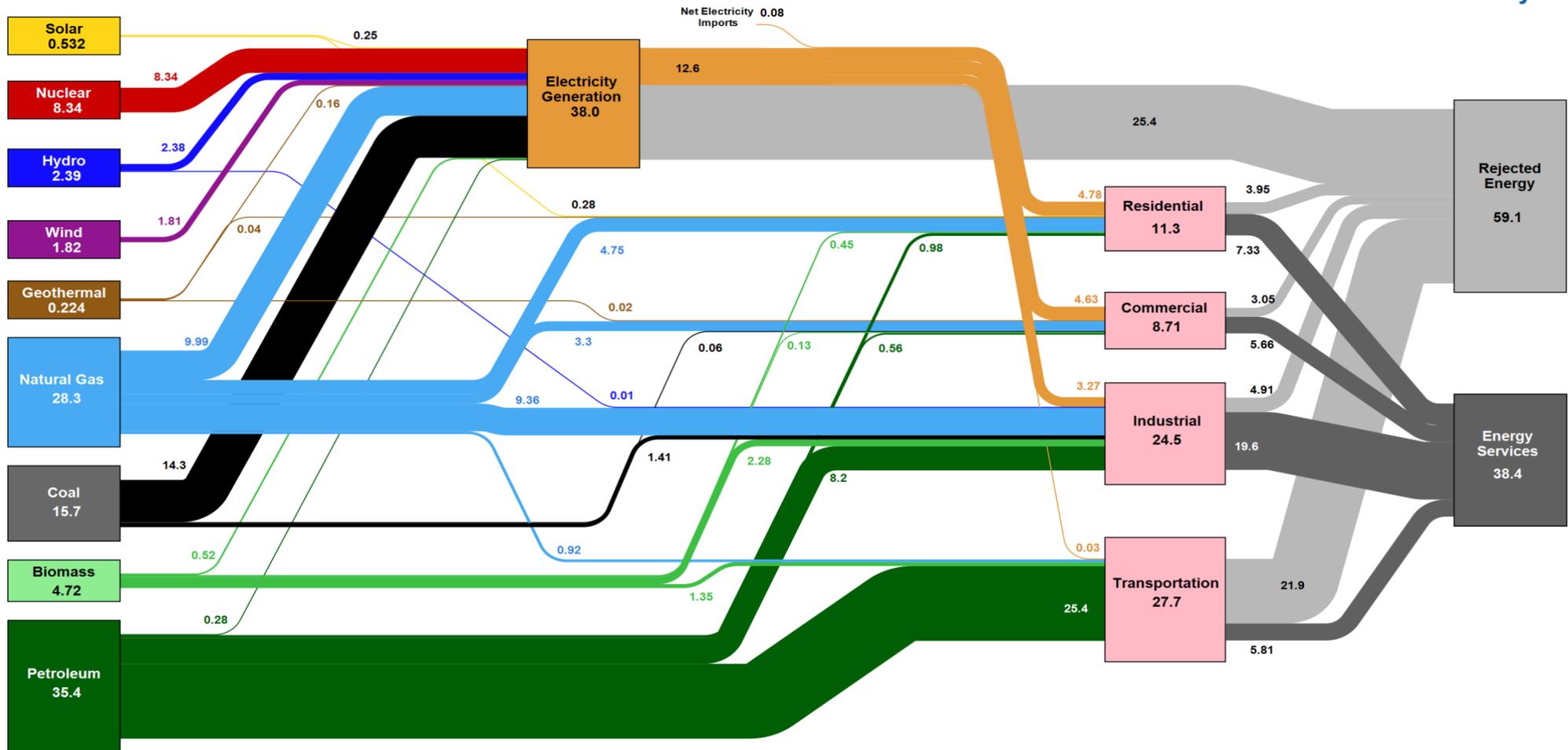
1990-2013



US Energy Inputs and Outputs – 2015

Lawrence Livermore Lab

Estimated U.S. Energy Consumption in 2015: 97.5 Quads



Source: LLNL March, 2016. Data is based on DOE/EIA MER (2015). If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e., hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant heat rate. The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential sector, 65% for the commercial sector, 80% for the industrial sector, and 21% for the transportation sector. Totals may not equal sum of components due to independent Rounding. LLNL-MI-410527

Aliso Canyon Natural Gas Storage Facility

Massive Leak Announced Oct 23, 2015



Compressed Natural Gas Stored 8500' underground – LA County



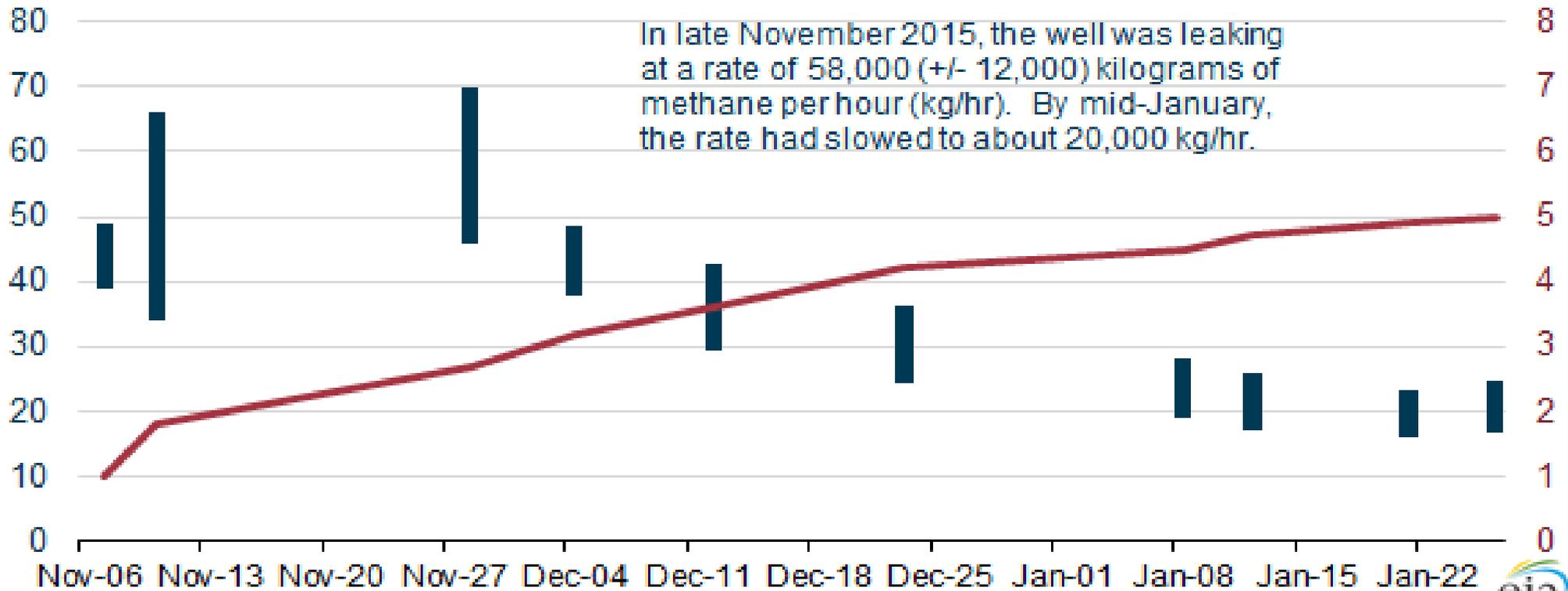
EDF
ENVIRONMENTAL
DEFENCE FUND



Estimates of natural gas leakage at Aliso Canyon

thousand kilograms of methane per hour

cumulative leakage
billion cubic feet of natural gas



Fossil fuels subsidised by \$10m a minute, says IMF

'Shocking' revelation finds \$5.3tn subsidy estimate for 2015 is greater than the total health spending of all the world's governments



Why we need to keep fossil fuels in the ground

In the last half of the old century,
transportation meant cars.



60,000 square miles



And Photosynthesis is
our friend!



The United States has paved
over the equivalent area of
the entire state of Georgia



“We’ve built America not for human beings, but for cars.”

Los Angeles image: <http://www.examiner.com/women-s-health-in-los-angeles/ucla-unearths-new-freeway-health-hazard-asthma-flare-ups>



Traffic along LA freeways and Wilshire Blvd.



The LA County Parking Crater:

18.6 Million Parking Spots Use 200 Square Miles of Space



*“Trying to hang on in the
Poconos: from before dawn to
way past dusk”*

New York Times, April 11, 2004

**Up at 3:30 am,
getting the
children to
childcare and
taking the 5:15
am bus to New
York**



Suburban

City's Annual Cost, per Household



\$3462

(Total)



Parks & Recreation
\$129



Solid Waste
\$185



Fire Department
\$406



Governance
\$297



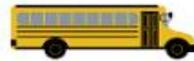
Police
\$360



Transportation
\$171



Libraries
\$72



School Bussing
\$87



Culture / Economy
\$36



Roads
\$280



Transfers to Provinces
eg. School Boards
\$435



Culture / Economy
\$19



Roads
\$26



Sidewalks & Curbs
\$194



Storm & Waste Water
\$613



Water
\$197



Storm & Waste Water
\$147



Water
\$42

SP Sustainable Prosperity

For more data and more reports, visit thecostofsprawl.com
Data based on Halifax Regional Municipality

Urban

City's Annual Cost, per Household



\$1416

(Total)



Parks & Recreation
\$69



Solid Waste
\$185



Fire Department
\$177



Governance
\$158



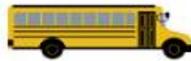
Police
\$192



Transportation
\$91



Libraries
\$38



School Bussing
\$13



Culture / Economy
\$19



Roads
\$26



Transfers to Provinces
eg. School Boards
\$232



Sidewalks & Curbs
\$27



Storm & Waste Water
\$147



Water
\$42

SP Sustainable Prosperity

For more data and more reports, visit thecostofsprawl.com
Data based on Halifax Regional Municipality

CDC Headquarters - Atlanta

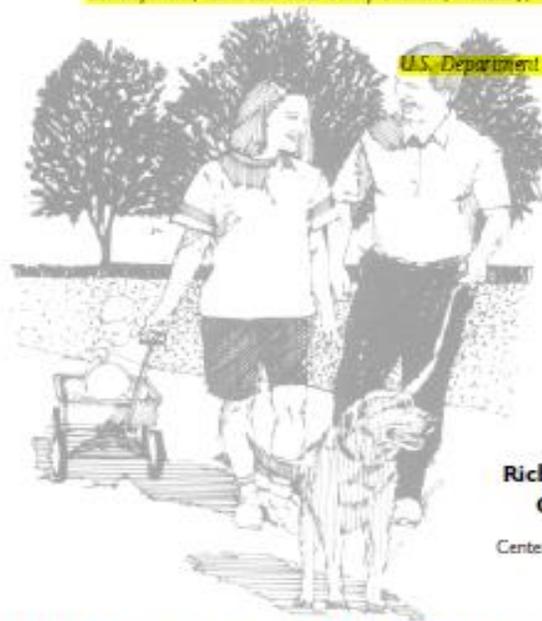


Creating A Healthy Environment:

The Impact of the Built Environment on Public Health

In its broadest sense, environmental health comprises those aspects of human health, disease, and injury that are determined or influenced by factors in the environment. This includes not only the study of the direct pathological effects of various chemical, physical, and biological agents, but also the effects on health of the broad physical and social environment, which includes housing, urban development, land-use and transportation, industry, and agriculture."

*—Healthy People 2010,
U.S. Department of Health and Human Services¹*



Richard J. Jackson, MD, MPH
Chris Kochtitzky, MSP

Centers for Disease Control and Prevention

SPRAWL WATCH CLEARINGHOUSE MONOGRAPH SERIES

Children with Diabetes

“[over 30 years] the percentage of new-onset type 2 diabetes in adolescence has increased from 3% to ~50% today”.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

A Clinical Trial to Maintain Glycemic Control in Youth with Type 2 Diabetes

TODAY Study Group*

ABSTRACT

BACKGROUND

Despite the increasing prevalence of type 2 diabetes in youth, there are few data to guide treatment. We compared the efficacy of three treatment regimens to achieve durable glycemic control in children and adolescents with recent-onset type 2 diabetes.

METHODS

Eligible patients 10 to 17 years of age were treated with metformin (at a dose of 1000 mg twice daily) to attain a glycated hemoglobin level of less than 8% and were randomly assigned to continued treatment with metformin alone or to metformin combined with rosiglitazone (4 mg twice a day) or a lifestyle-intervention program focusing on weight loss through eating and activity behaviors. The primary outcome was loss of glycemic control, defined as a glycated hemoglobin level of at least 8% for 6 months or sustained metabolic decompensation requiring insulin.

The members of the writing group — Phil Zeitler, M.D., Ph.D., University of Colorado Denver, Aurora; Kathryn Hirst, Ph.D., and Laura Pyle, M.S., George Washington University, Washington, DC; Barbara Linder, M.D., Ph.D., National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD; Kenneth Copeland, M.D., University of Oklahoma Health Sciences Center, Oklahoma City; Silva Arslanian, M.D., Children's Hospital of Pittsburgh, Pittsburgh; Leona Cuttler, M.D., Case Western Reserve University, Cleveland; David M. Nathan, M.D., Massachusetts General Hospital, Boston; and Robert Eckel, M.D., Children's Hospital of Pittsburgh, Pittsburgh.

David B Allen MD

New England Journal of Medicine

April 29, 2012

*Prevalence of and
Trends in Diabetes
Among Adults in
the United States,
1988-2012*



Andy Menke; Sarah Casagrande; Linda Geiss, Catherin Cowie
2015;314(10):1021 doi:10.1001/jama.2015.10029

JAMA.

Diabetes Prevalence NHANES

(using Hemoglobin A_{1c} , FPG)

Sample of US Population

All Age Groups, Races, Income and Education

1988-1994

2000-2002

2011-2012

9.8%

10.8%

12.4%

For Prediabetes

36.5%

“The Status of Baby Boomers’ Health in the United States”

JAMA
Internal Medicine
February 4, 2013

RESEARCH LETTER

ONLINE FIRST

The Status of Baby Boomers' Health in the United States: The Healthiest Generation?

From 1946 through 1964, 78 million children (“baby boomers”) were born in the United States. In 2010, baby boomers made up 26.1% of the US population.¹ Medicine has improved significantly during baby boomers’ lifetimes. Although these advantages have led to a progressively increasing life expectancy,² previous studies have shown mixed results regarding whether baby boomers are healthier than prior generations.^{3,4} The present study examined the health status of aging baby boomers relative to the previous generation to provide a vitally important context for health workforce and policy planning in the coming years.

Methods. We analyzed data from the National Health and Nutrition Examination Survey (NHANES), including NHANES III (1988-1994) (for previous generation) and the NHANES for 2007 to 2010 (for baby boomers), focusing on respondents who were aged 46 to 64 years during either period. The 2 cohorts were compared with regard to health status, functional and work disability, healthy lifestyle characteristics, and presence of chronic disease. Further details of the methods can be found in the eAppendix (<http://www.jamainternalmed.com>).

Results. The demographic characteristics of the cohorts were very similar except for the proportions in each racial/ethnic group, with greater proportions of non-Hispanic blacks (11.3% vs 9.4%) and Hispanics (9.8% vs 3.7%) in the 2007-2010 group compared with the 1988-1994 group ($P < .001$). The mean (SD) ages were 54.1 (0.03) years in the 2007-2010 group and 54.5 (0.03) years in the 1988-1994 group; there was no difference in sex between the 2 cohorts (49.1% male [2007-2010 group] vs 47.3% male [1988-1994 group]). Overall health status was lower in baby boomers, with 13.2% reporting “excellent” health compared with 32% of individuals in the previous generation ($P < .001$). Of the sampled baby boomers, compared with the previous generation, 6.9% vs 3.3% used a walking assist device ($P < .001$), 13.8% vs 10.1% were limited in work ($P = .003$), and 13.3% vs 8.8% had a functional limitation ($P < .001$).

With regard to healthy lifestyle factors, obesity was more common among baby boomers (38.7% obese vs 29.4% [previous generation]; $P < .001$) (Figure), and regular exercise was significantly less frequent (35.0%

vs 49.9% exercise > 12 times per month; $P < .001$); more than half of baby boomers reported no regular physical activity (52.2% vs 17.4%; $P < .001$). Moderate drinking was higher in the baby boomer cohort compared with the previous generation (67.3% vs 37.2%; $P < .001$). There were fewer current smokers in the baby boomer cohort than in the previous generation (21.3% vs 27.6%; $P < .001$).

The percentage of individuals with hypertension (Figure) was more common among baby boomers than among individuals from the previous generation (43.0% vs 36.4%; $P < .001$), as was the percentage of individuals who take medication for hypertension (33.4% vs 23.2%; $P < .001$). Among baby boomers, hypercholesterolemia was more common (73.3% vs 33.8%; $P < .001$ [Figure]), and medication use for hypercholesterolemia was more than 10 times greater (23.9% vs 1.9%; $P < .001$). Baby boomers were also more likely to have diabetes (13.3% vs 12.0%; $P = .003$ [Figure]) and take medication for diabetes (11.3% vs 6.2%; $P < .001$). The slight trend toward higher prevalence of cancer in baby boomers vs the previous generation was not significant (10.6% vs 9.3%; $P = .25$). The frequency of emphysema decreased in the baby boomer generation (2.3% relative to the previous generation (3.3%)) ($P = .03$). Baby boomers were also less likely to have had a myocardial infarction (3.6%) compared with the previous generation (5.3%) ($P = .004$).

A logistic regression was conducted to control for changes in demographic characteristics (age, sex, race,

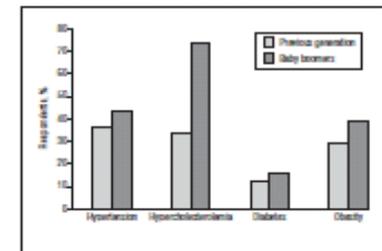


Figure. Proportion of each cohort (baby boomers and previous generation) at age 46-64 years with hypertension, hypercholesterolemia, diabetes, or obesity in the 1988-1994 and 2007-2010 NHANES. The difference between cohorts was statistically significant for prevalence of hypertension ($P < .001$), hypercholesterolemia ($P < .001$), diabetes ($P = .003$), and obesity ($P < .001$). Obesity is defined as the proportion of individuals who exceeded a body mass index of 30 (calculated as weight in kilograms divided by height in meters squared). NHANES indicates National Health and Nutrition Examination Survey.

Overall Health Status US

Persons Aged 46-64

NHANES 1988-1994

NHANES 2007-2010

Report “excellent” health

32%

13%

Limitations to Life Functions

9%

14%

Using Walking Assist (wheelchair, cane, etc.)

3%

7%

“Lifestyle Factors” US Persons Aged 46-64 (NHANES)

1988-1994

2007-2010

Smoking

28%

21%

Obesity

29%

39%

“Lifestyle Factors” US Persons Aged 46-64 (NHANES)

1988-1994

2007-2010

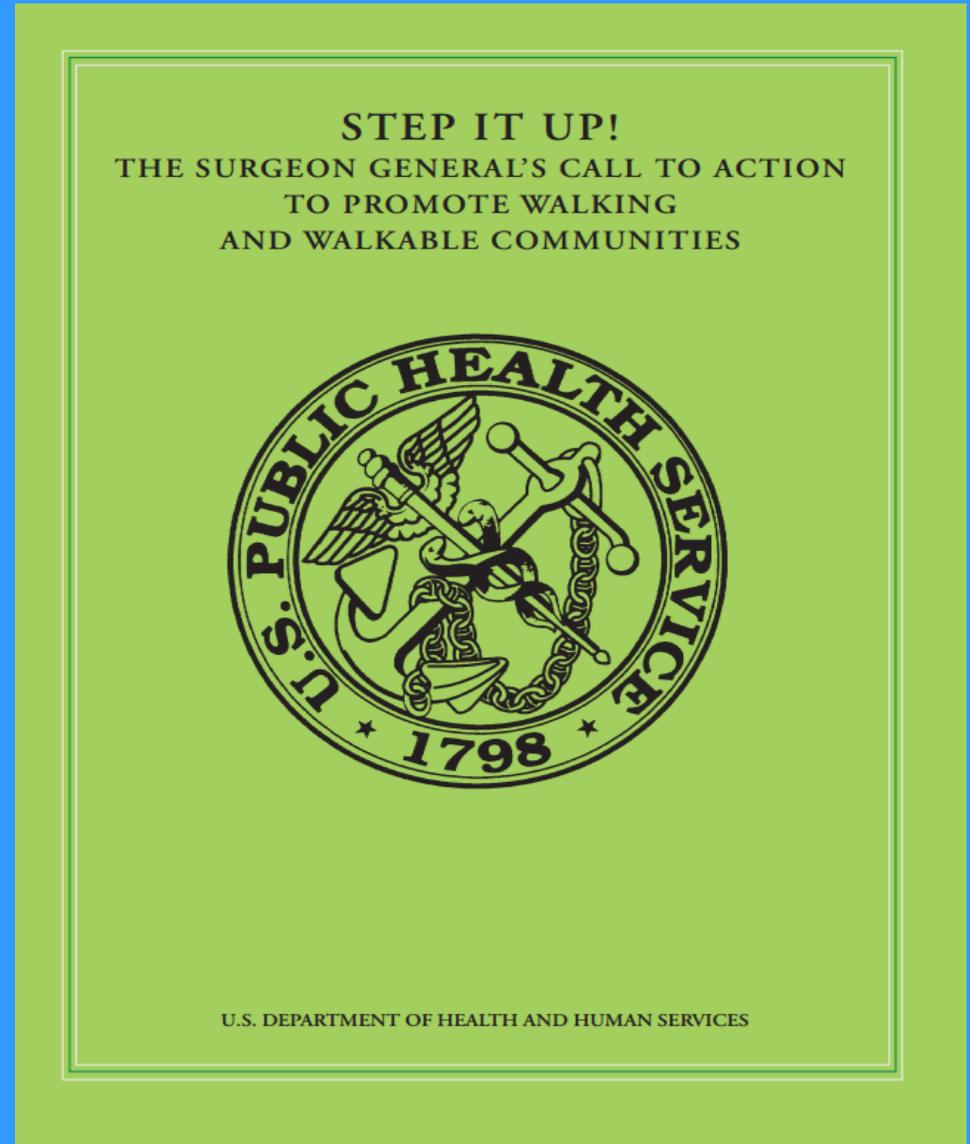
No Regular Physical Activity

17%

52%

Solutions

Surgeon General's Call to Action to Promote Walking 2015



May 24/31, 2016, Vol 315, No. 20 >

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Original Investigation | May 24/31, 2016

Association of Neighborhood Walkability With Change in Overweight, Obesity, and Diabetes

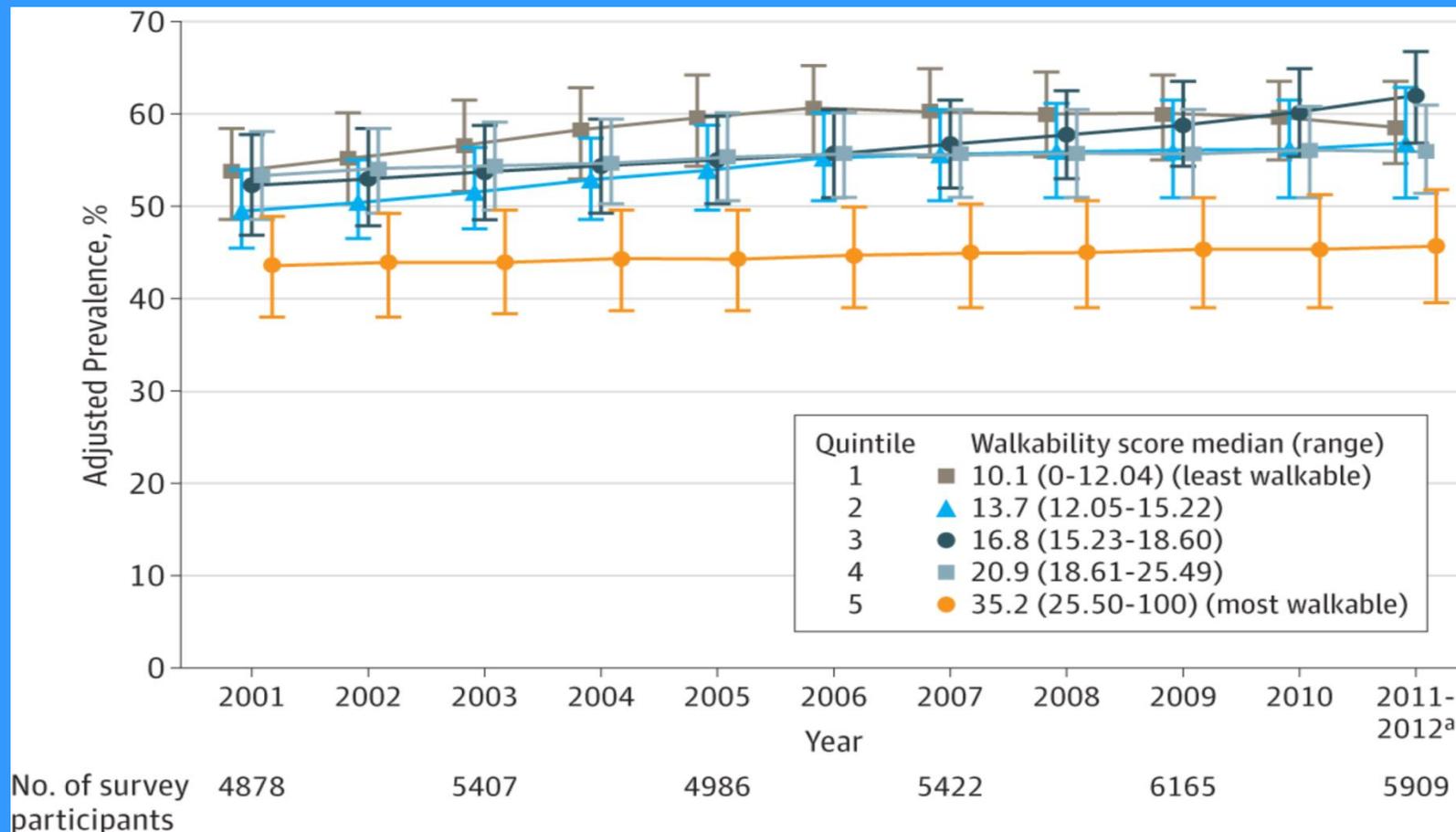
FREE

Maria I. Creatore, PhD^{1,2,3}; Richard H. Glazier, MD^{1,2,3,4,5,6}; Rahim Moineddin, PhD^{1,2,4,6}; Ghazal S. Fazli, MPH^{1,4,5}; Ashley Johns, MSc^{1,5}; Peter Gozdyra, MA^{1,2,5}; Flora I. Matheson, PhD^{2,3,5}; Vered Kaufman-Shriqui, PhD⁵; Laura C. Rosella, PhD^{2,3,4}; Doug G. Manuel, MD, PhD^{2,7}; Gillian L. Booth, MD^{1,2,4,8}

Canada Walkability and Obesity and Diabetes Study

- 8777 neighborhoods
- Adults ages 30-64
- 2001 to 2012
- Biennial Canadian Community Health Survey

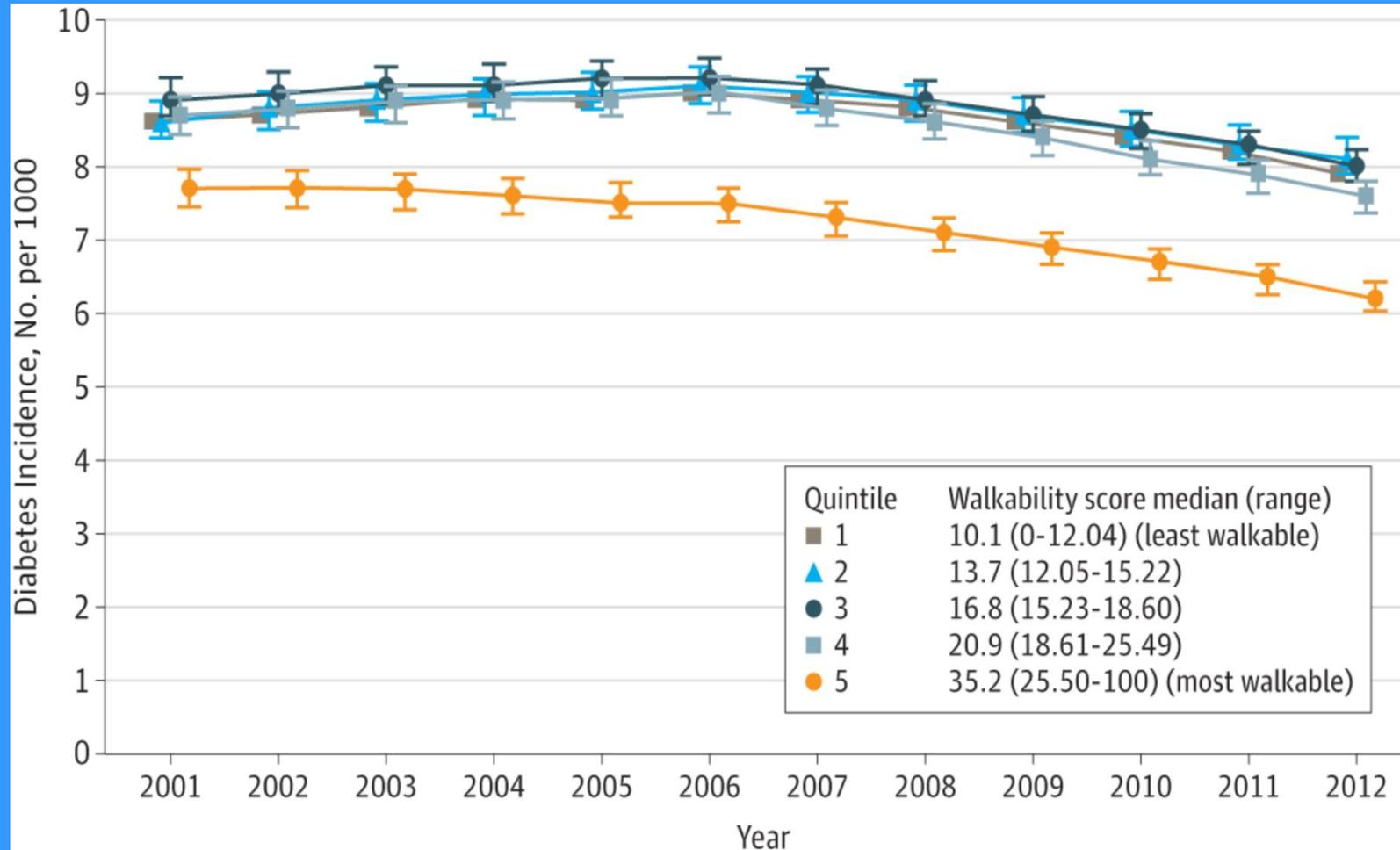
Changes in Overweight, Obesity and Diabetes Vs Walkability Score 2001-2012



Canada Health Survey persons age 30-64

In 8777 Canada Neighborhoods - Data from survey data

Diabetes Incidence and Neighborhood Walkability 2001-2012

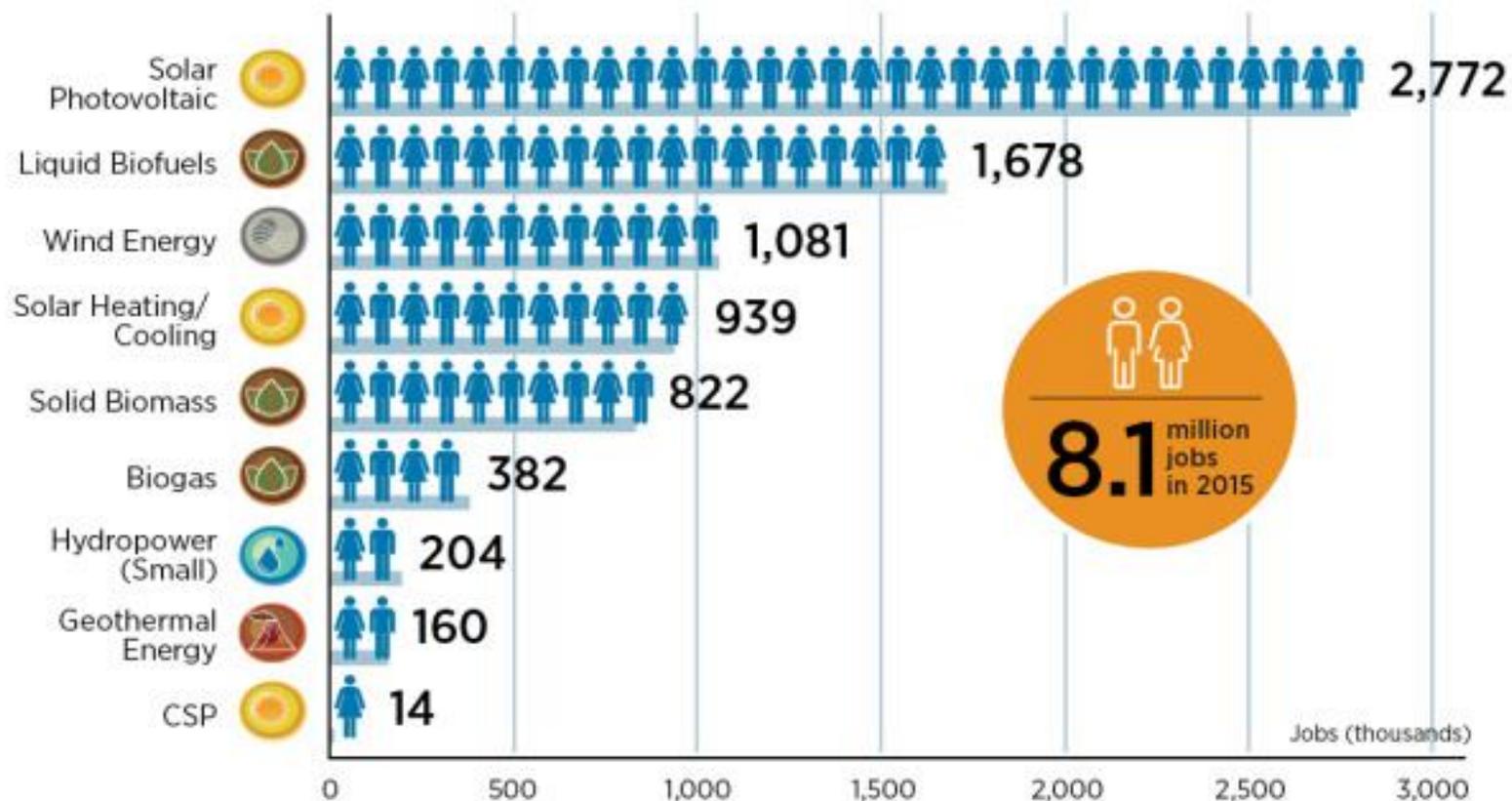


3 million persons ages 30-64 in 8777 Canada Neighborhoods
Data from healthcare data

Policy Change



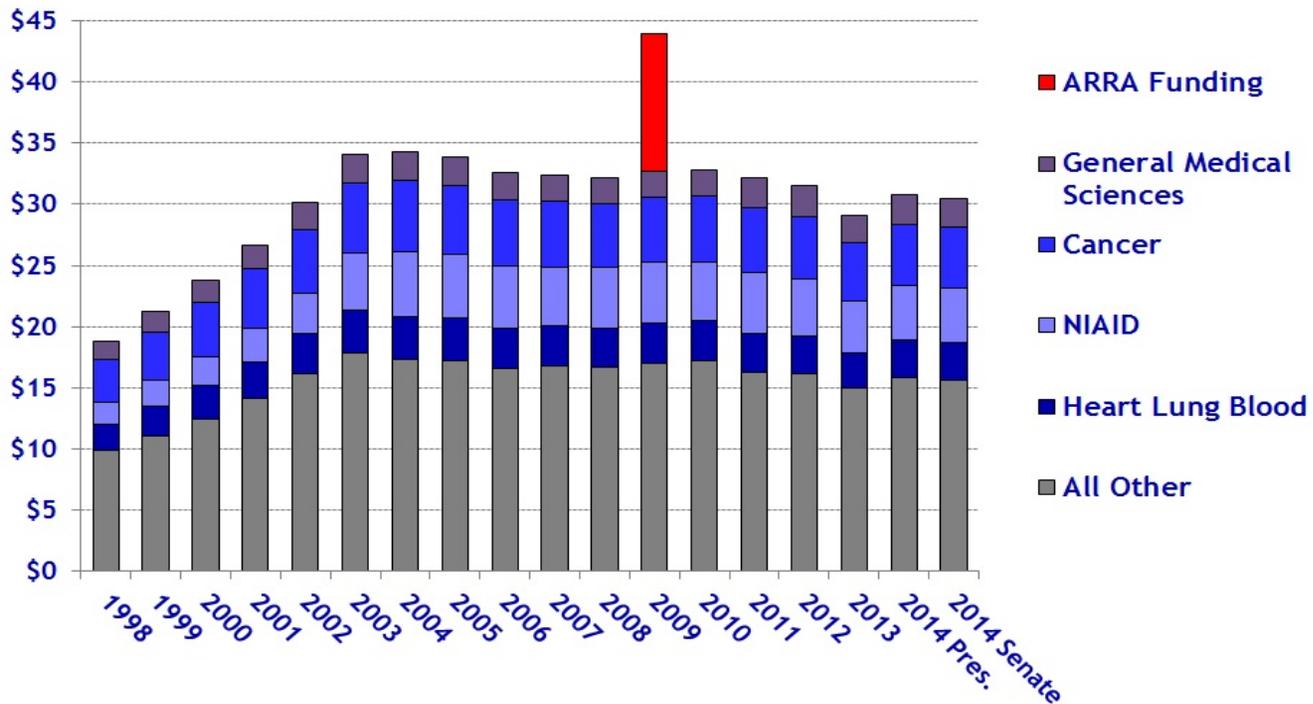
RENEWABLE ENERGY EMPLOYMENT BY TECHNOLOGY



NIH Budget

National Institutes of Health Budget, 1998-2014

budget authority in billions of constant FY 2013 dollars



Source: AAASReport: Research and Development, agency budget documents, and appropriations reports. FY 2013 figures are latest estimates.

© 2013 AAAS



Climate Change and Health Accounts for 0.027% of the NIH Budget



Under current statute, the California general plan is presented as a collection of seven “elements,” or topic categories

- Required

- Circulation
- Housing
- Conservation
- Open Space
- Noise
- Safety
- Air Quality

- “Optional”

- Health
- Equity
- Community Development
- Water
- Resiliency
- Others as communities request or need. “Optional”

Every Chapter of the 2015 **Draft California
General Plan** Has the Byline:

*Designing Healthy, Equitable,
Resilient and Economically
Vibrant Places*

Chapter 2: A Vision for Long-Range Planning

Designing Healthy, Equitable, Resilient, and Economically Vibrant Places

Caltrans Mission and Vision

Effective 2014

Caltrans strives for an interconnected, multimodal transportation system that is consistent with its newly adopted mission statement:

Mission: *Caltrans provides a safe, sustainable, integrated, and efficient transportation system to enhance California's economy and livability.*

This transportation system must accommodate all modes of travel – highway users, transit users, pedestrians, and bicyclists. We know California's transportation system cannot meet our state's needs with just highways. We can only make a safe, sustainable, effective and efficient transportation system if we work to improve all modes of travel.

Vision: *A performance-driven, transparent and accountable organization that values its people, resources, and partners, and meets new challenges through leadership, innovation and teamwork.*

Policy Change

The Urgent Need for a Carbon Tax Including for Reasons of Equity

Designing a Carbon Tax to Reduce U.S. Greenhouse Gas Emissions

Gilbert E. Metcalf*

Introduction

Public sentiment and political opinion have recently shifted dramatically in favor of the United States taking action on climate change. As illustration, the Democratic and Republican nominees for presidency last year supported imposing limits on U.S. carbon emissions. This would complement European actions on carbon emissions through the European Union's (EU) Emission Trading Scheme (ETS), which recently finished the first year of its second phase of emission limits. With the United States poised to take the major policy step of initiating limits on carbon emissions, this article, which is part of a broader symposium on Alternative U.S. Climate Policy Instruments,¹ makes the economic and political case for using a carbon tax as the policy instrument for curtailing domestic greenhouse gas (GHG) emissions.

Conventional wisdom holds that a carbon tax is not a politically viable option for controlling carbon emissions because the tax makes overly explicit the costs associated with

Damage by CO₂ Emissions
Per Metric Ton
Social Cost Estimates

\$18

Increasing by 4%/year

Short-run Fossil Fuel Costs with a Carbon Tax of \$15/ton CO₂e

Would add to:

Gasoline: 13 cents/ gallon

Natural Gas: 54 cents/ 1000 ft³

Short-run Emissions Reductions with a Carbon Tax of \$15/ton CO₂e

Coal	14.7%
Petroleum Products	5.6%
Natural Gas	3.4%

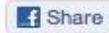
Would generate about \$90 billion per year
About \$560/per American



British Columbia's carbon tax shift: An environmental and economic success



SUBMITTED BY **STEWART ELGIE** ON WED, 09/10/2014



*By Stewart Elgie, Professor of Law & Economics at University of Ottawa and Chair of **Sustainable Prosperity**; Ross Beaty, Chairman of Pan American Silver Corp. and Alterra Power; and Richard Lipsey, Professor Emeritus of Economics at Simon Fraser University.*

We often hear claims that a carbon tax would destroy jobs and growth. Yet the evidence from a Canadian province that actually passed such a tax – British Columbia – tells a very different story.

The latest numbers from Statistics Canada show that B.C.'s policy has been a real environmental and economic success after six years. Far from a "job killer," it is a world-leading example of how to tackle one of the greatest global challenges of our time: building an economy that will prosper in a carbon constrained world.

British Columbia's Carbon Tax

Revenue Neutral

- Begun July, 2008, covers fuel use and carbon emissions.
- 2008: \$10 per ton of carbon dioxide, Increased by C\$5 p/y.
- In 2014 \$30 per ton (now \$0.26/gal of gasoline)
- Carbon Tax revenue reduced BC income and other taxes > \$760 million

Per capita consumption of Petroleum Products Subject to BC carbon Tax (% change)

	2007/08- 2008/09	2008/09- 2009/10	2009/10- 2010/11	2010/11- 2011/12	2011/12- 2012/13	2007/08- 2012/13
BRITISH COLUMBIA	-3.5%	-6.7%	-1.3%	-6.2%	0.7%	-16.1%
REST OF CANADA	-2.5%	-1.5%	6.8%	-1.7%	2.2%	3.0%
DIFFERENCE	-1.0%	-5.2%	-8.1%	-4.5%	-1.5%	-19.1%

Source: Statistics Canada, Author Calculations

2007-2012

British Columbia -16.1%

Rest of Canada +3%



CicLAvia Los Angeles April 2012

In Which Place Would Many Smart Young People (or Lively Retirees) Want to Live?



0 10 20 (km)

POPULATION: **5.25 MILLION**
URBAN AREA: **4,280 KM²**



0 10 20 (km)

POPULATION: **5.33 MILLION**
URBAN AREA: **162 KM²**

Atlanta

Barcelona



0 10 20 (km)



0 10 20 (km)

POPULATION:	5.25 MILLION
URBAN AREA:	4,280 KM²
TRANSPORT	
CARBON EMISSIONS:	7.5
TONNES CO ₂ PER PERSON	
(PUBLIC + PRIVATE	
TRANSPORT)	

POPULATION:	5.33 MILLION
URBAN AREA:	162 KM²
TRANSPORT	
CARBON EMISSIONS:	0.7
TONNES CO ₂ PER PERSON	
(PUBLIC + PRIVATE	
TRANSPORT)	

DESIGNING HEALTHY COMMUNITIES



RICHARD J. JACKSON WITH STACY SINCLAIR

Richard J Jackson MD MPH

FAAP HonAIA HonFASLA

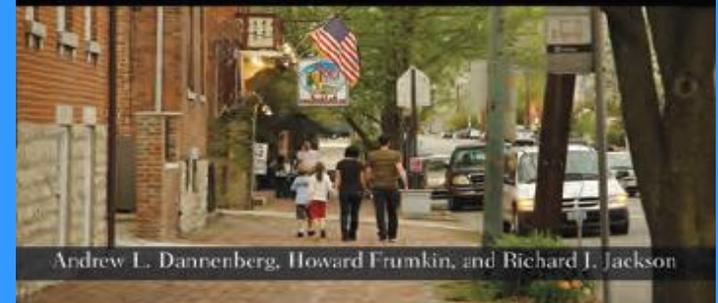
dickjackson@ucla.edu

UCLA

Fielding School of Public Health



**MAKING HEALTHY
PLACES** Designing and Building for Health,
Well-being, and Sustainability



Andrew L. Dannenberg, Howard Frumkin, and Richard J. Jackson