

Bright Future:

Accelerating the Clean Energy Transition

Port Townsend High School
March 25, 2016



Climate Solutions
PRACTICAL SOLUTIONS TO GLOBAL WARMING



Agenda



- Climate Solutions
- Climate Imperative
- Climate Movement
- Stop Making It Worse
- Bright Future
- Q & A



Climate Solutions Mission

Accelerate *practical, profitable* solutions to global warming by:

- ✓ Galvanizing leadership
- ✓ Growing investment
- ✓ Bridging divides

GOAL: Make the Northwest a national and world leader in the clean energy economy

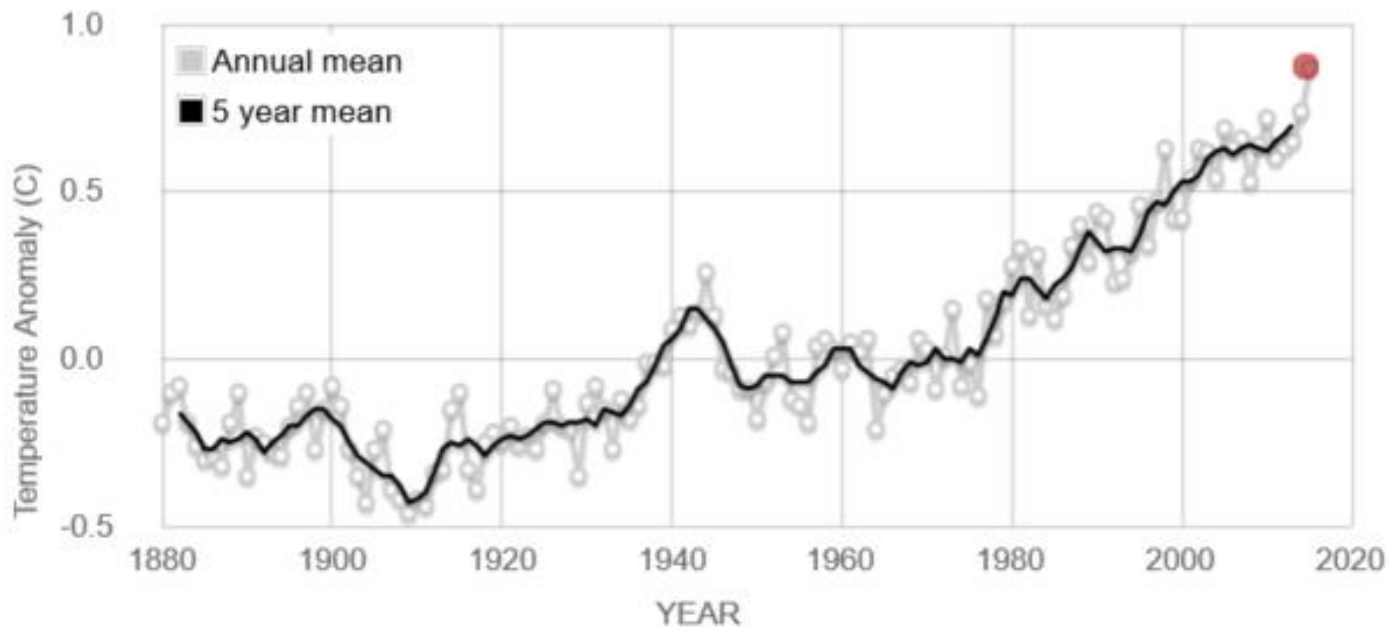


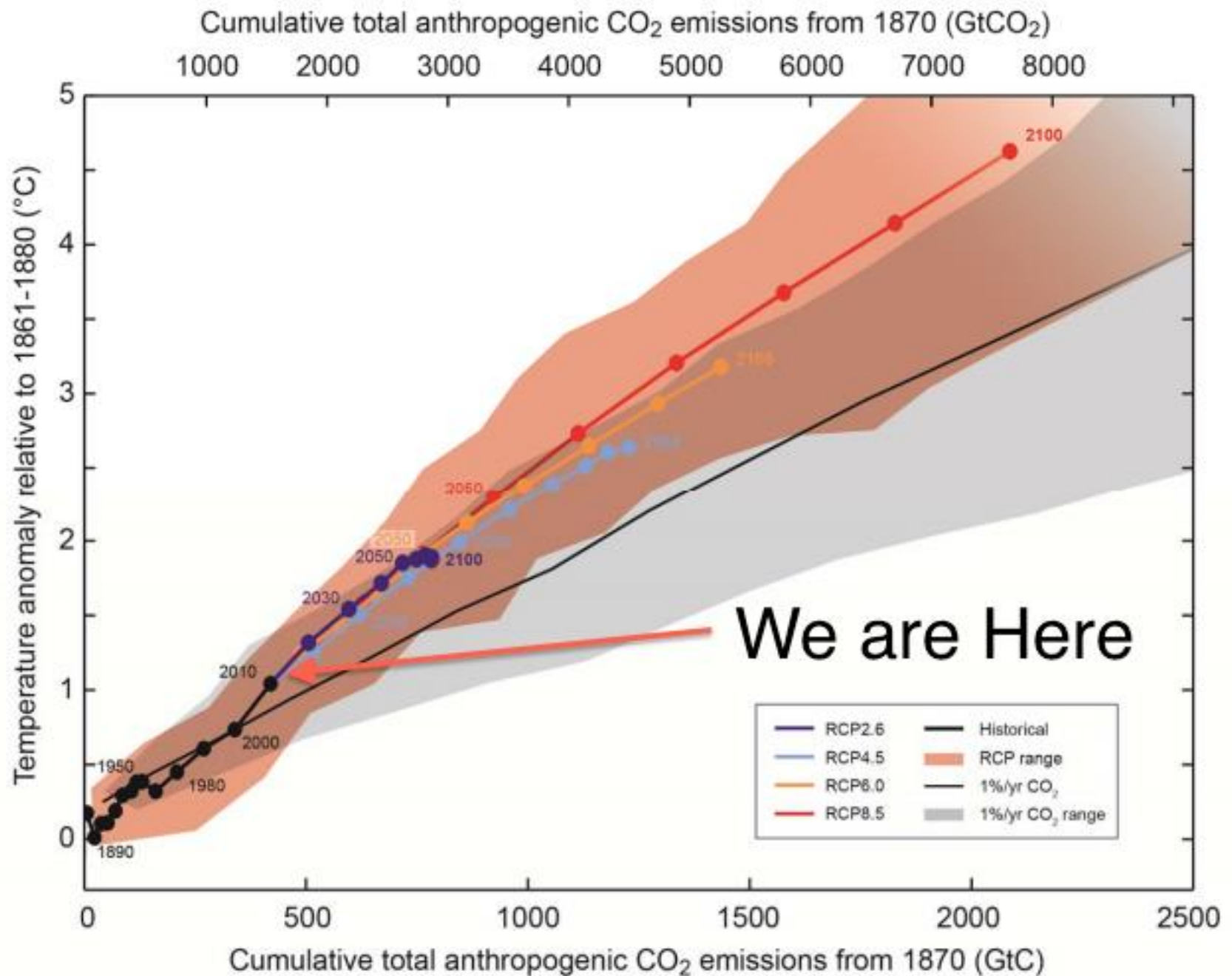
Unbroken Pattern of Warming

GLOBAL LAND-OCEAN TEMPERATURE INDEX

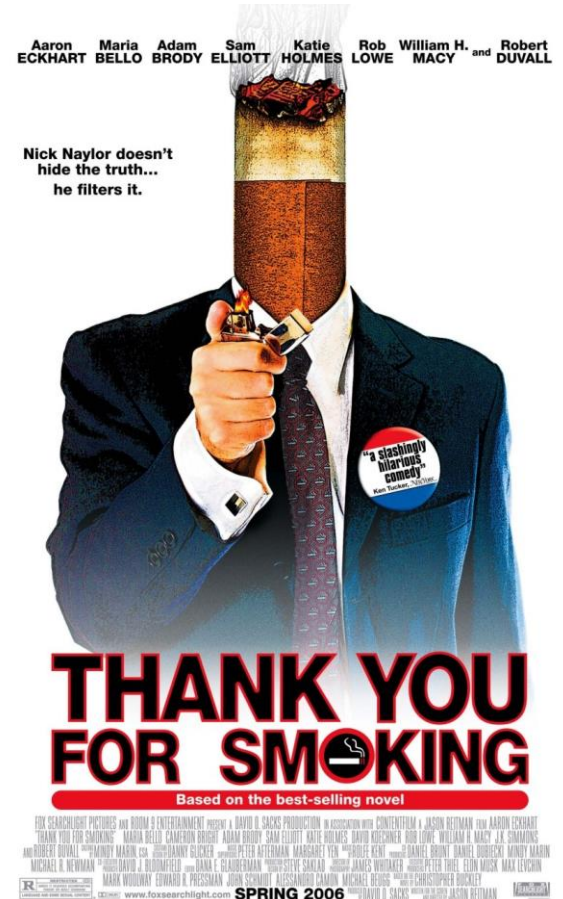
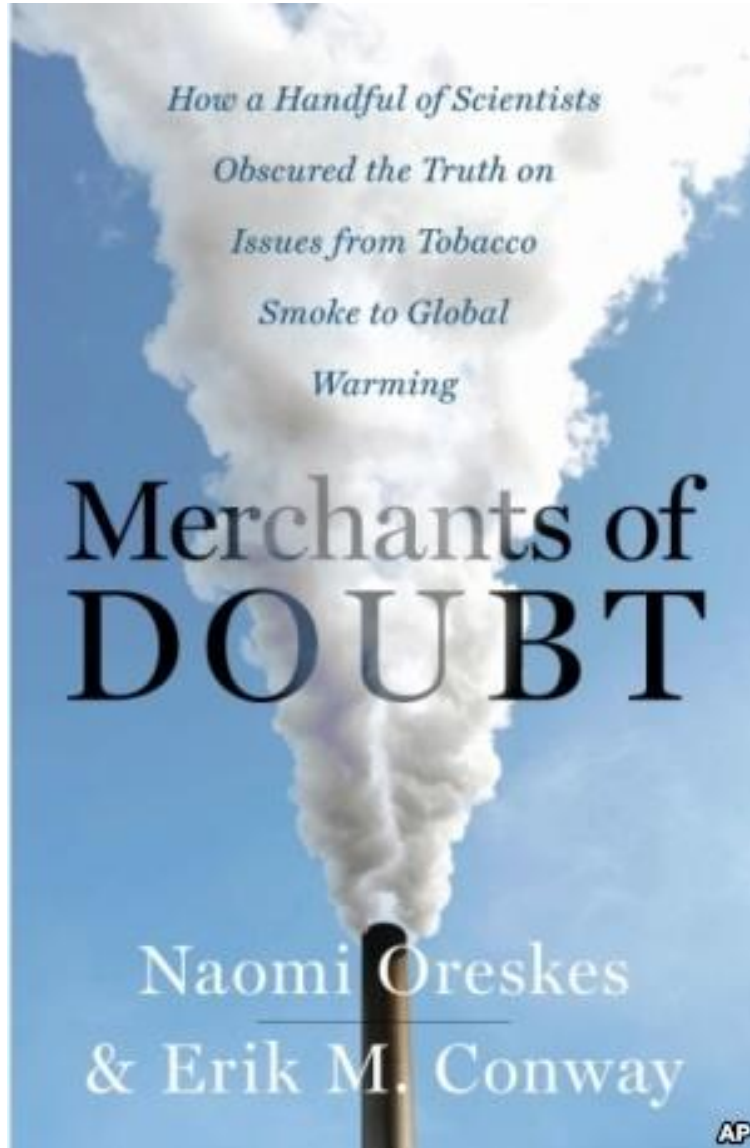
Data source: NASA's Goddard Institute for Space Studies (GISS).

Credit: NASA/GISS





What's Holding Us Back?



© 2006 Twentieth Century Fox Film Corporation. All Rights Reserved.



Fossil Fuel Industry Thwarts Progress



[Home](#) > [What We Do](#) > [Stop Global Warming](#) > [PolluterWatch](#) >
Koch Industries: Secretly Funding the Climate Denial Machine

Koch Industries: Secretly Funding the Climate Denial Machine

The Koch Brothers have sent at least \$79,048,951 to groups denying climate change science since 1997.

Greenpeace uses 1997 as a benchmark year due to increased coordinated backlash against global climate negotiations leading to the Kyoto Protocol of 1998. We define climate change denial as "anyone who is obstructing, delaying or trying to derail policy steps that are in line with the scientific consensus that says we need to take rapid steps to decarbonize the economy."



PolluterWatch

Koch Indust

- > CASE STUI
- > CASE STUI
- > CASE STUI
- > CASE STUI
- > Koch Indu:
- > Koch Direc
- > Koch PAC I
- > Koch Fund
- > Koch Indu:



Secret funding helped build vast network of climate denial thinktanks

Anonymous billionaires donated \$120m to more than 100 anti-climate groups working to discredit climate change science

How Donors Trust distributed millions to anti-climate groups



Climate sceptic groups are mobilising against Obama's efforts to act on climate change in his second term.
Photograph: Justin Sullivan/Getty Images

But It's Not Working Anymore



"You won't find [climate change skeptics] on the fire line in the American West anymore."

Tom Boatner, Chief Fire Operations, BLM July 2013



**Once the canary in the coal mine,
now the oyster in the ocean**



Climate Movement



Climate Resistance



A Moral Awakening



Paris Agreement



Shell No(*t necessary*)



“[I]n the world where we burn Arctic Oil, the Port [of Seattle] -
- and coastal cities everywhere - will sink under rising,
acidified oceans” - KC Golden, Policy Advisor, Climate Solutions



Stop Making It Worse

- The make or break issue: Energy infrastructure decisions in growing economies can't lock in carbon emissions for decades to come



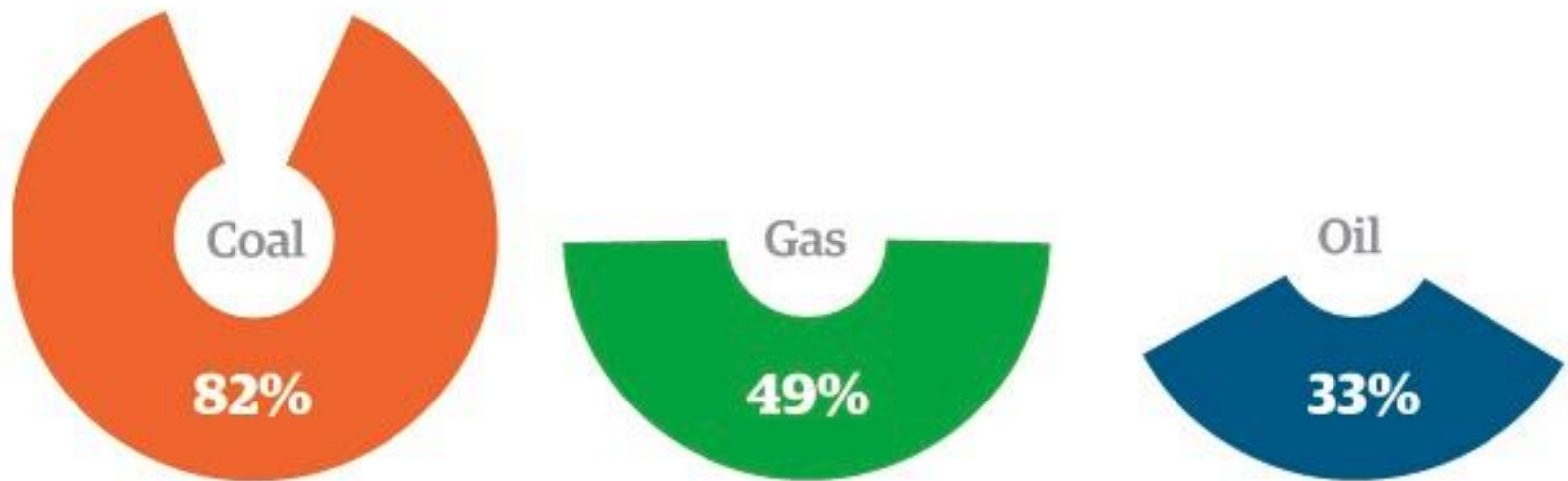
Carbon Bubble

Unburnable fossil fuels

Known, extractable coal, oil and gas reserves that must not be burnt in order to prevent dangerous climate change of more than 2C

Global reserves

Per cent that cannot be burned



No to Coal and Oil





proposed coal terminals



killed projects



projects in litigation



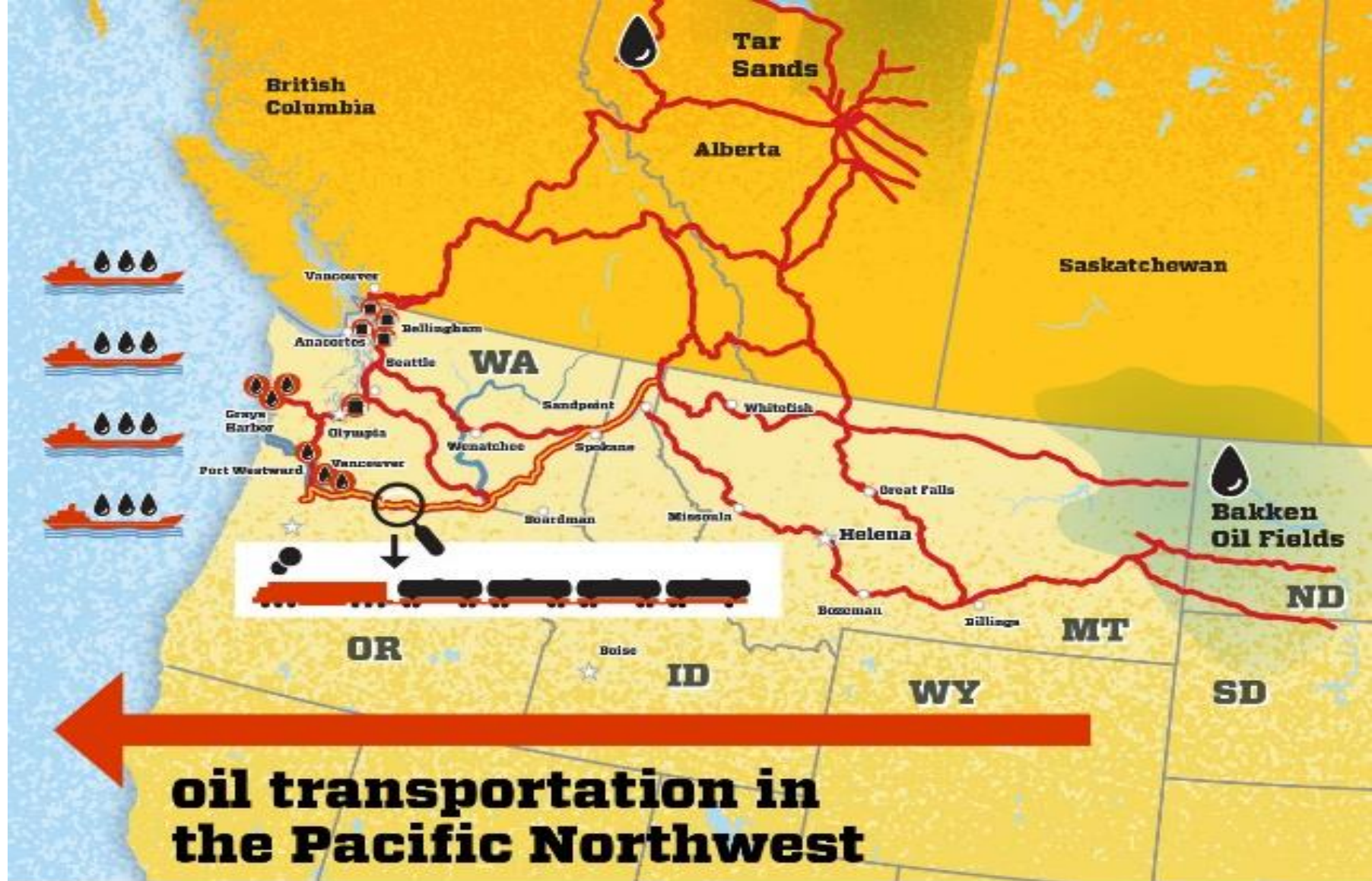
train routes



coal-bearing ship



coal-bearing train



oil terminal



oil refinery



train routes



high volume train routes



oil-bearing ship



oil-bearing train

Keystone Principle

"IF WE'RE GONNA PREVENT
LARGE PARTS OF THIS EARTH
FROM BECOMING NOT
ONLY **INHOSPITABLE**
BUT **UNINHABITABLE**
IN OUR LIFETIMES,
WE'RE GONNA HAVE TO
**KEEP SOME FOSSIL
FUELS IN THE GROUND.**"

PRESIDENT OBAMA ON WHY HE REJECTED THE KEYSTONE XL PIPELINE, NOV. 6, 2015



#KEEPITINTHEGROUND



Getting Off Coal



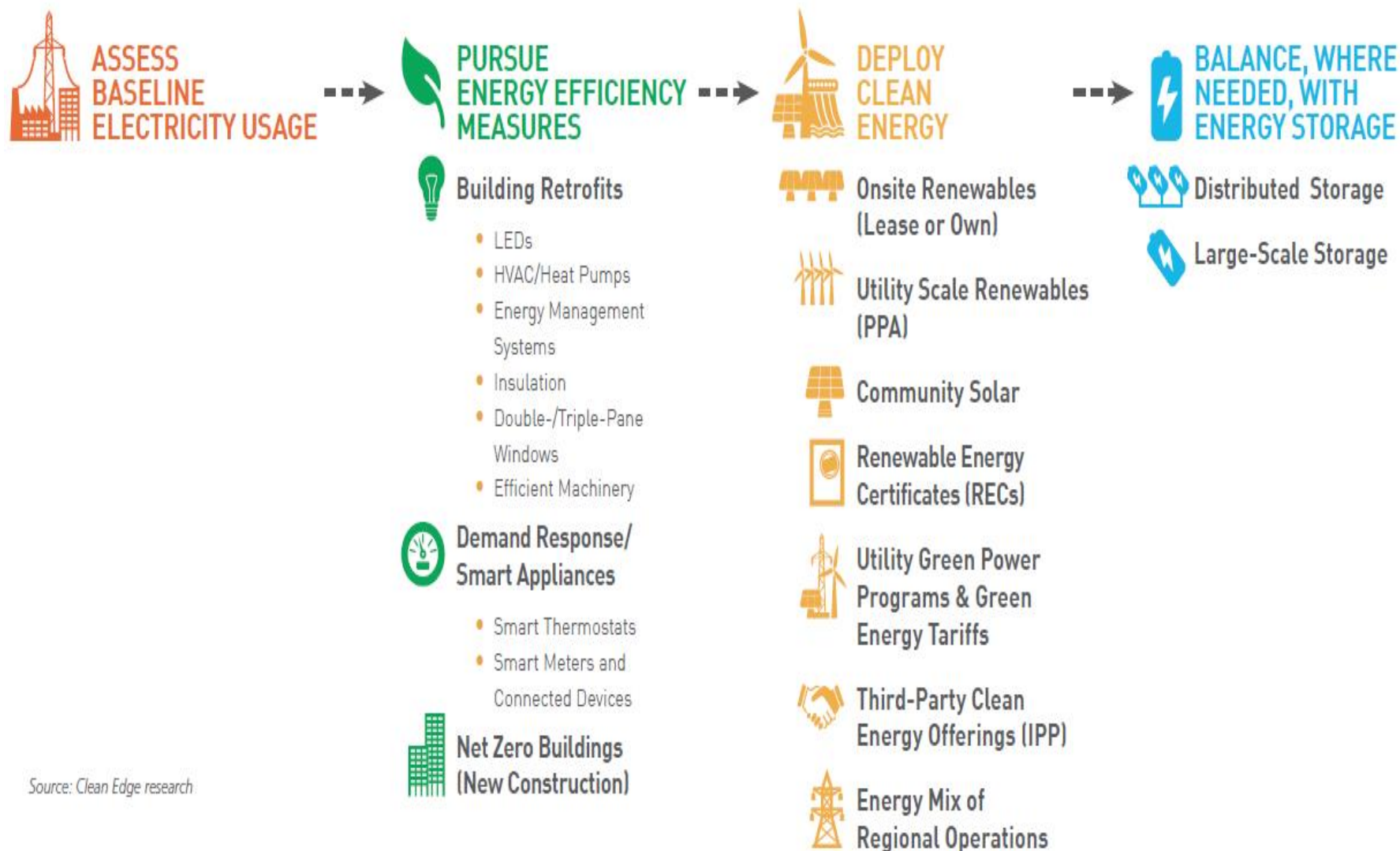


Clean Power

- Energy Efficiency: The less we use, the less we need to extract or build
- Coal to Clean: Remove coal from grid by 2035
- Limit Natural Gas: Only a limited bridge from coal to clean energy
- Renewable Energy: Distributed and utility-scale
- Utility of the Future: Smart grid, generation, transmission, and new business model



Getting to 100% Renewables

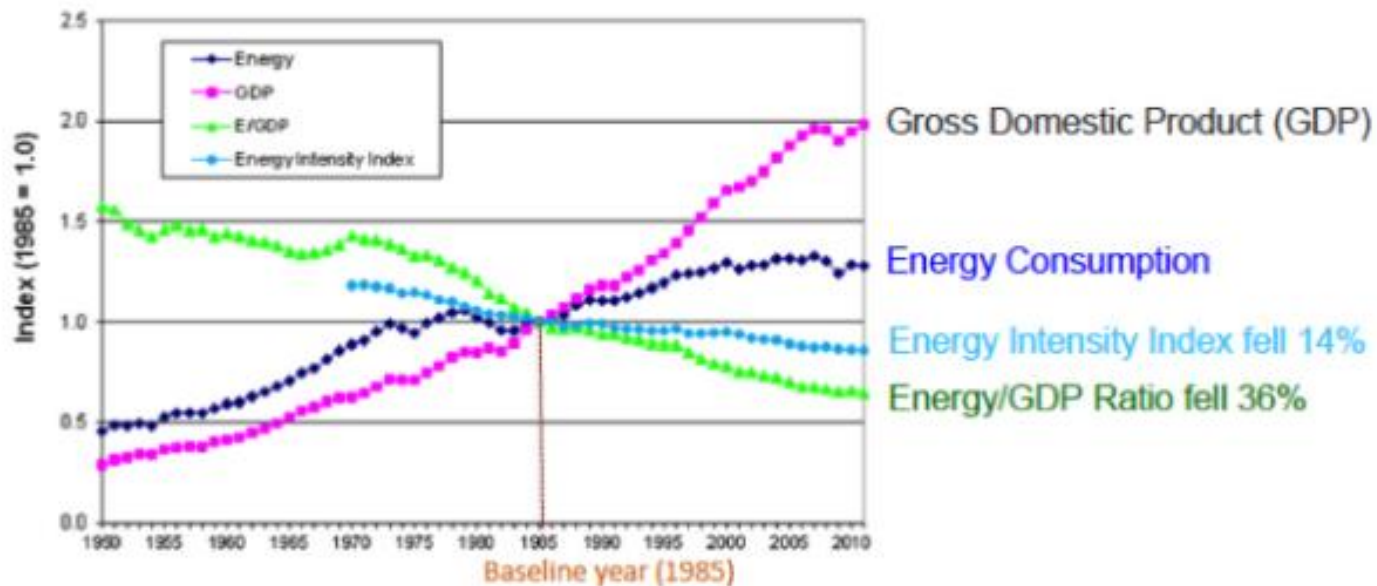


Source: Clean Edge research

Energy Efficiency - The First Solution

Economy Growth vs. Energy Use

Pacific Northwest
NATIONAL LABORATORY
Proudly Operated by Battelle Since 1965



The economy-wide Energy Intensity Index excludes structural factors (e.g. decline of energy-intensive industries) and reflects changes in energy intensity associated with energy efficiency.

Energy Efficiency Resource Standards

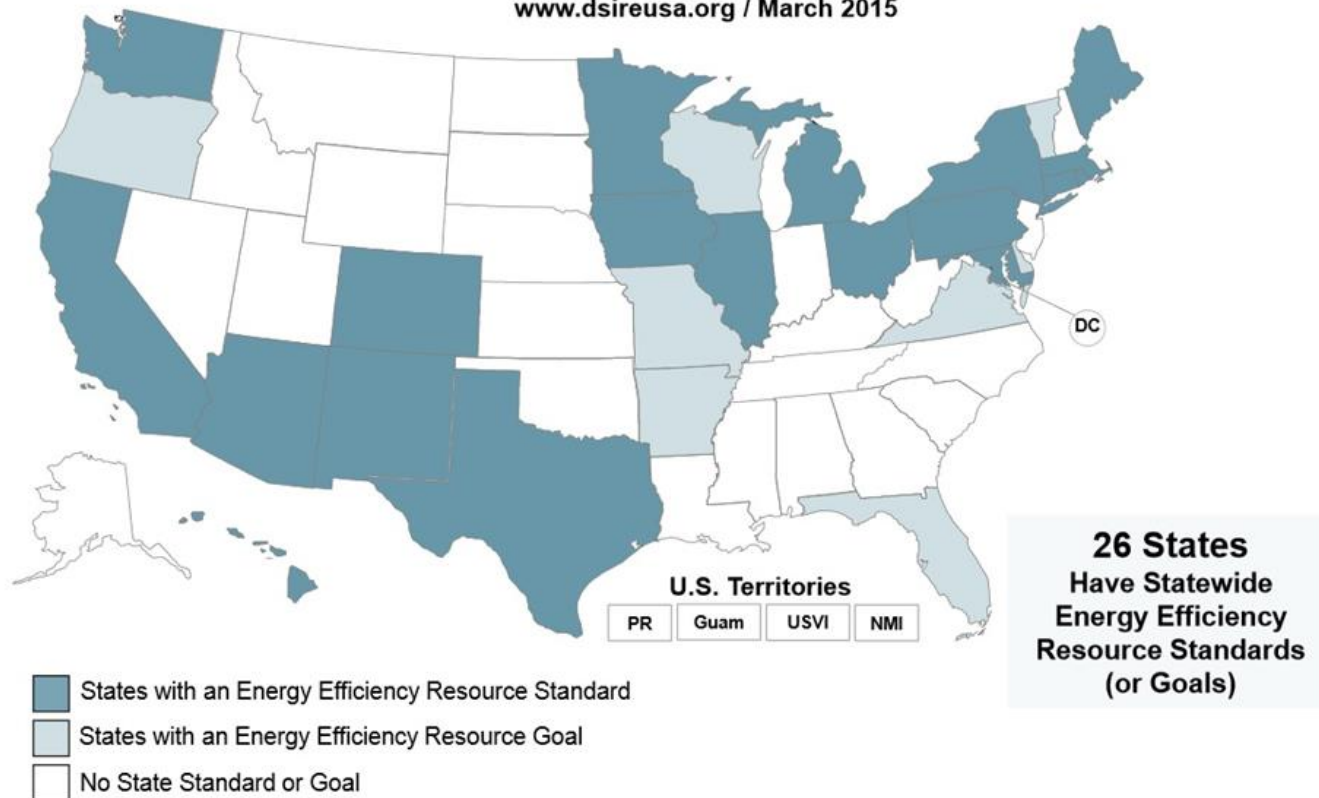


U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

Energy Efficiency Resource Standards (and Goals)

www.dsireusa.org / March 2015



Source: U.S. Department of Energy: Energy Efficiency & Renewable Energy. <http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2015/03/Energy-Efficiency-Resource-Standards.pdf>



Renewable Portfolio Standards

DSIRE®

NC CLEAN ENERGY
TECHNOLOGY CENTER

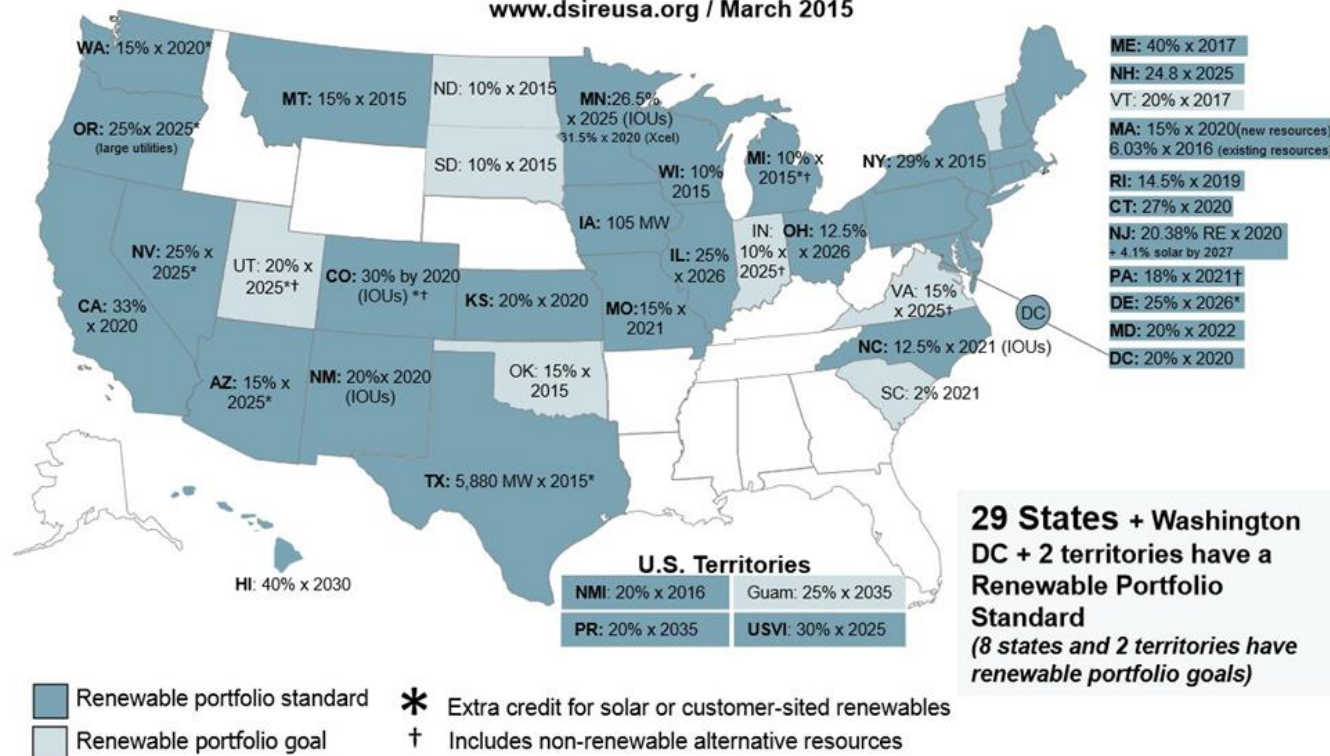


U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

Renewable Portfolio Standard Policies

www.dsireusa.org / March 2015



Source: U.S. Department of Energy: Energy Efficiency & Renewable Energy.










<http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2014/11/Renewable-Portfolio-Standards.pdf>



Clean Energy, Coal Transition Act



Getting to 100% Renewables

COMPANY	GEOGRAPHIES COVERED	TARGET DATE	INTERIM DATE	MOST RECENT REPORTED %
	Global	Long-term; Not Specified	50% by end of 2018	21% (2014)
	Global	2020	N/A	N/A
	Global	Long-term; Not specified.	N/A	37% (2014)
	Global	2020	N/A	59% (2014)
	Global	2040	Reduce fossil fuel energy use by 25% by 2015	N/A
	Global	2025	N/A	N/A
	All data centers	Long-term; Not Specified	N/A	43% (2015)
	Global	Long-term; Not Specified	N/A	N/A
	Global	Long-term; Not Specified	Produce or procure 7 billion kWh of renewable electricity globally by 2020	26% (2014)

Source: Clean Edge research. Note: Clean Edge makes no claim to the logos in the above table. All trademarks are the property of the respective companies.



Getting Off Oil



CLEAN FUEL & TRANSPORTATION





Moving Beyond Oil

- Transportation largest source of carbon pollution: 46% in Washington and 36% of Oregon
- Oil use declining with more efficient vehicles using less gas, people driving less, and vehicles using lower carbon fuels
- 2025 vehicles use half as much fuel to go the distance they went in 2011
- Half the oil by 2030
 - ✓ VMT reduction
 - ✓ Cleaner fuels, including electricity
 - ✓ Compact, transit-centered communities



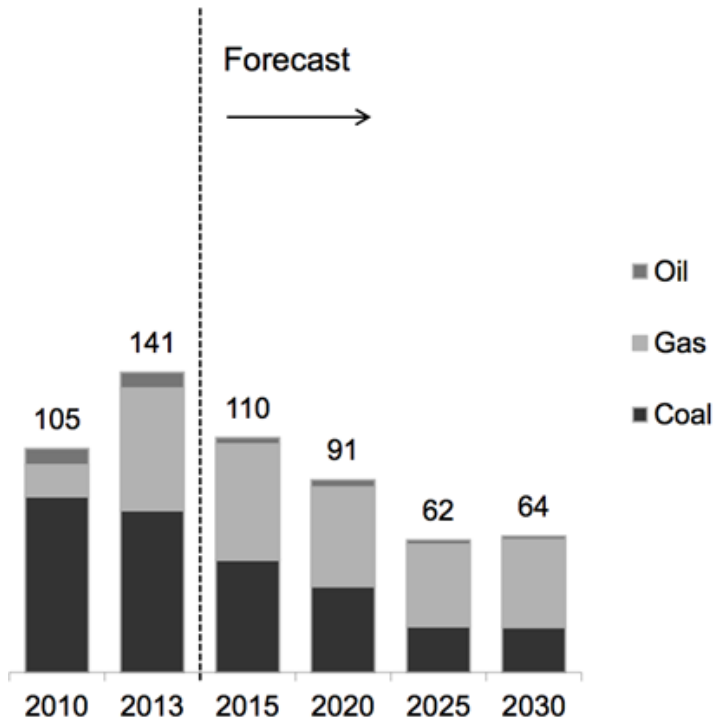
Oil Can't Compete with Renewables

National Bank of Abu Dhabi: While fossils have been heart of energy investment for past decades, future dollars will flow primarily to renewables

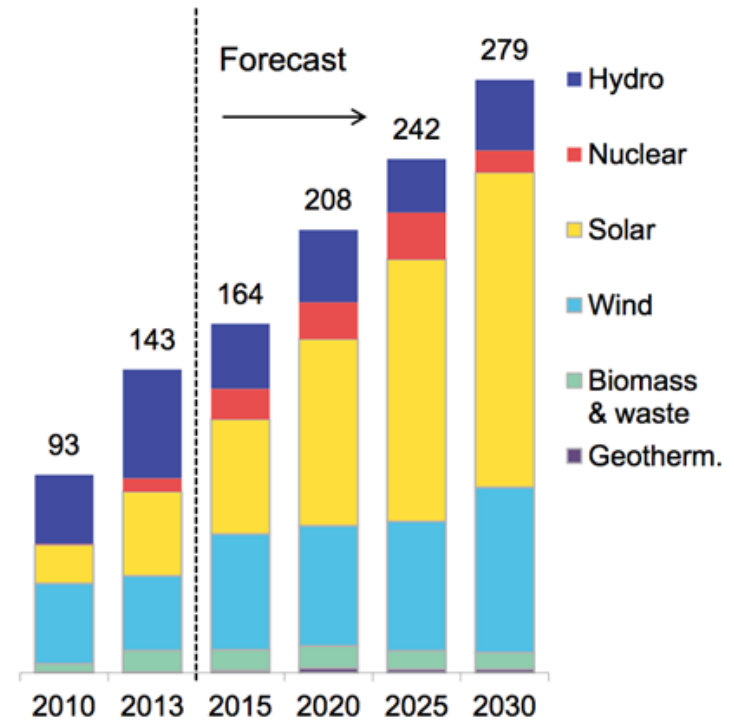


Fossil Fuels Losing Race Against Renewables

FOSSIL FUEL



CLEAN ENERGY



"Fossil Fuels Just Lost the Race against Renewables" April 14, 2015

<http://www.bloomberg.com/news/articles/2015-04-14/fossil-fuels-just-lost-the-race-against-renewables>



Sustainable Advanced Fuels

- Scaling low-carbon, sustainable and cost-effective alternatives to petroleum in transportation sector:
 - ✓ Electric Vehicles
 - ✓ Biojet
 - ✓ Biofuels
 - ✓ Renewable Natural Gas





Clean Energy Economy

- Clean Trillion: Tremendous clean energy investment opportunity
- Economics of Renewables: Rapidly falling costs; dramatic adoption of renewable energy
- Economic Development: Clean jobs are eclipsing fossil fuel jobs

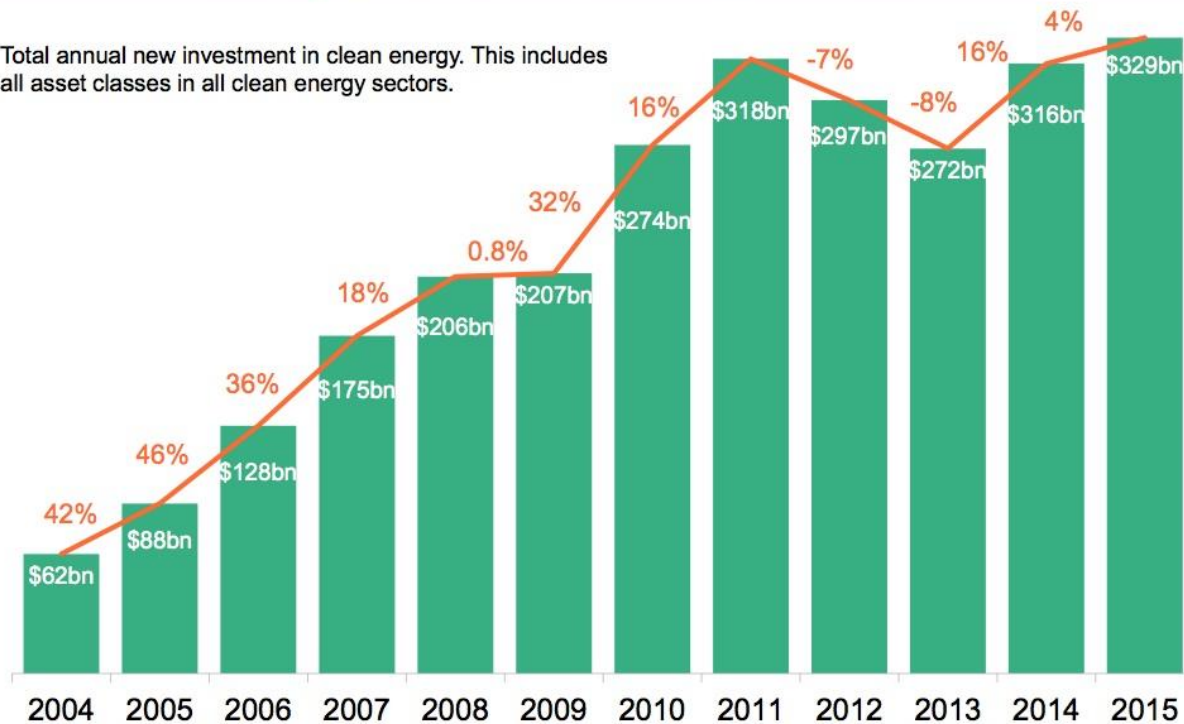


Record Investment in 2015

NEW INVESTMENT IN CLEAN ENERGY 2004-15 (\$BN)

Bloomberg
NEW ENERGY FINANCE

- Total annual new investment in clean energy. This includes all asset classes in all clean energy sectors.



Note: Total values include estimates for undisclosed deals. Includes corporate and government R&D, and spending for digital energy and energy storage projects (not reported in quarterly statistics).

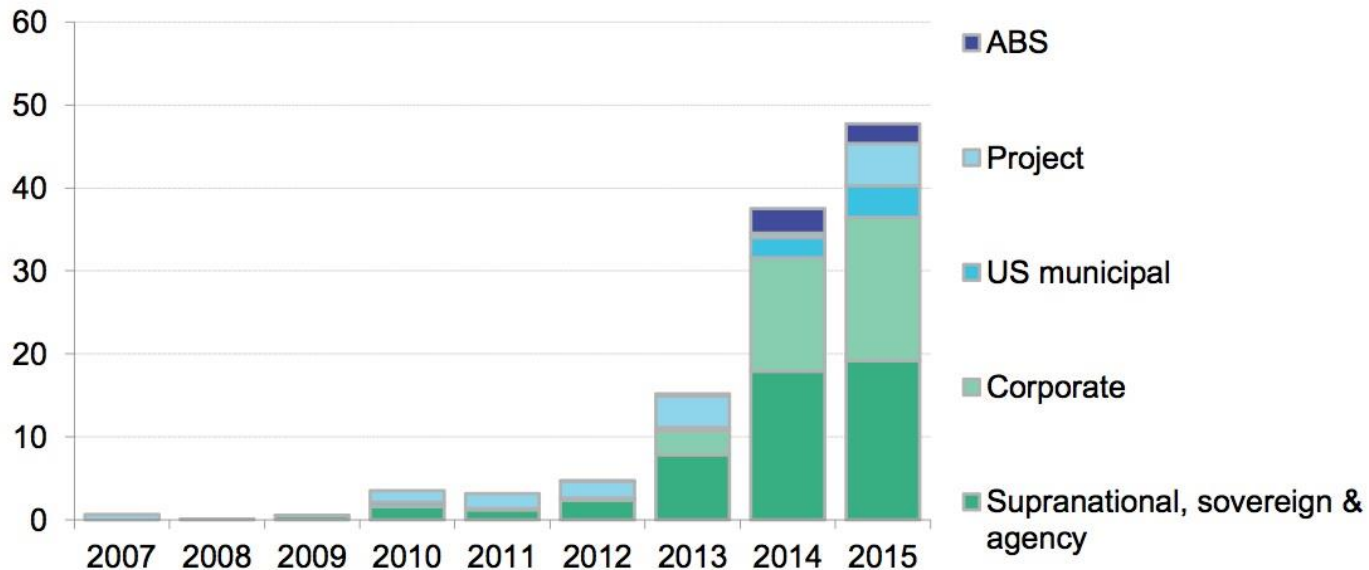
Source: Bloomberg New Energy Finance



Green Bonds Surging

ANNUAL HISTORICAL GREEN BOND ISSUANCE, BY TYPE, 2007-15 (\$BN)

Bloomberg
NEW ENERGY FINANCE



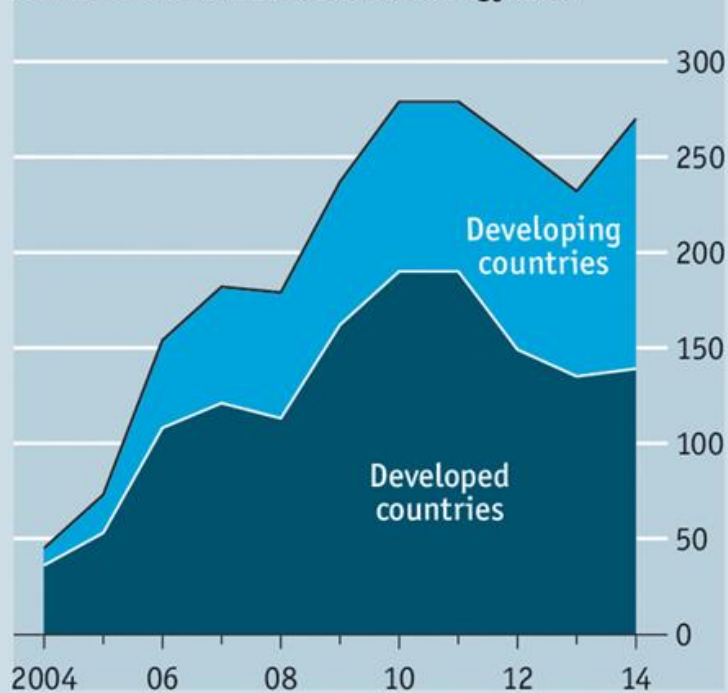
Notes: (1) The funds raised by green bonds are neither entirely inclusive nor exclusive of figures for clean energy asset finance. (2) 'Corporate', 'sovereign, supranational and agency' and 'US municipal' include only bonds explicitly labelled as green and which meet the criteria for receiving a green bond 'tag' on the Bloomberg Terminal. (3) 'Project' includes bonds backed by the cash flows of an underlying renewable energy project or portfolio of projects. (4) 'ABS' includes asset-backed securities whose cash flows come from a portfolio of underlying receivables such as loans, leases and PPAs where the receivables are associated with green (eg, renewable energy, energy efficiency) projects.



Investment Up – Costs Down

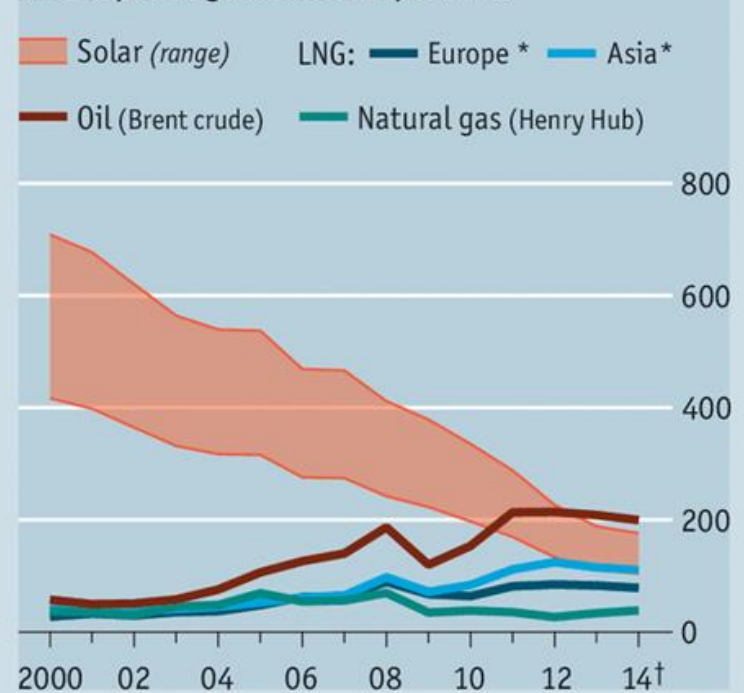
Sunny outlook

New investment in renewable energy, \$bn



Sources: UNEP, Bloomberg New Energy Finance; IHS Energy

Cost of power generation, \$ per MWh



*Long-term contract price †To November

Economist.com

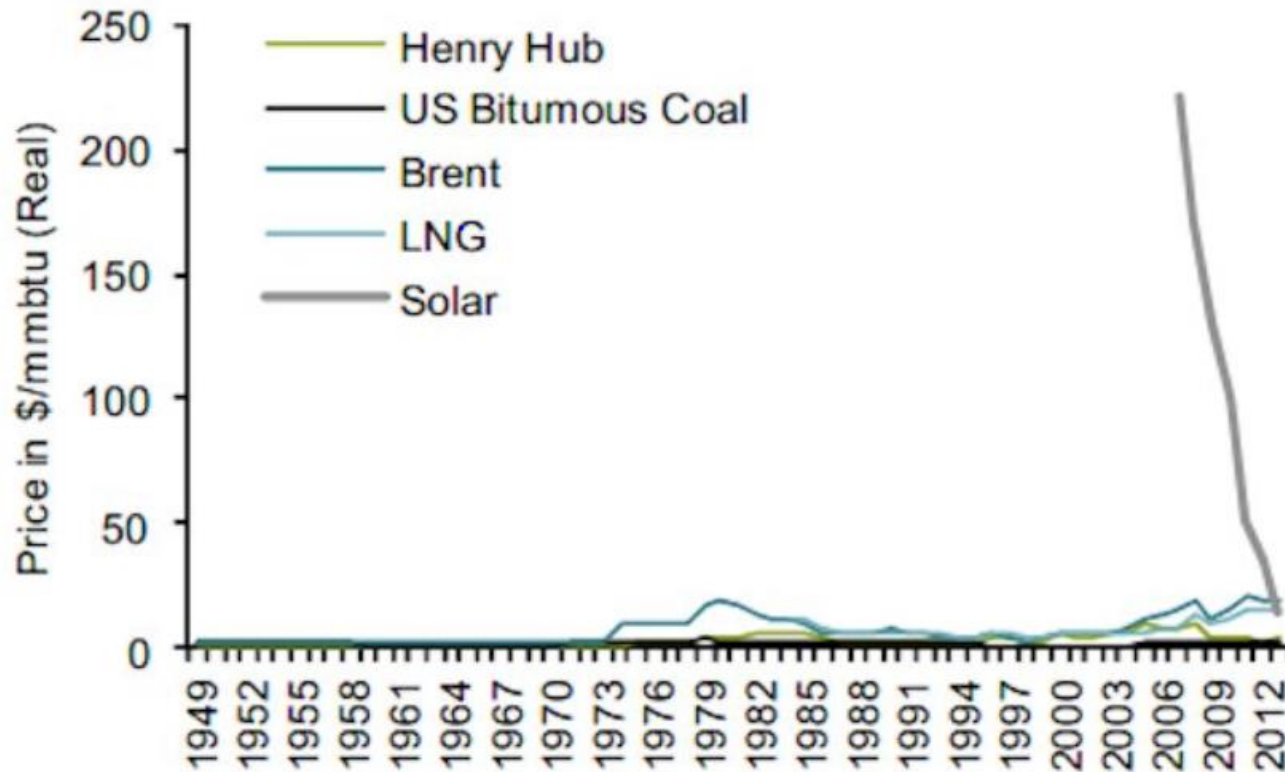
Source: <http://www.economist.com/news/international/21647975-plummeting-prices-are-boosting-renewables-even-subsidies-fall-not-toy>



Plummeting Price of Solar

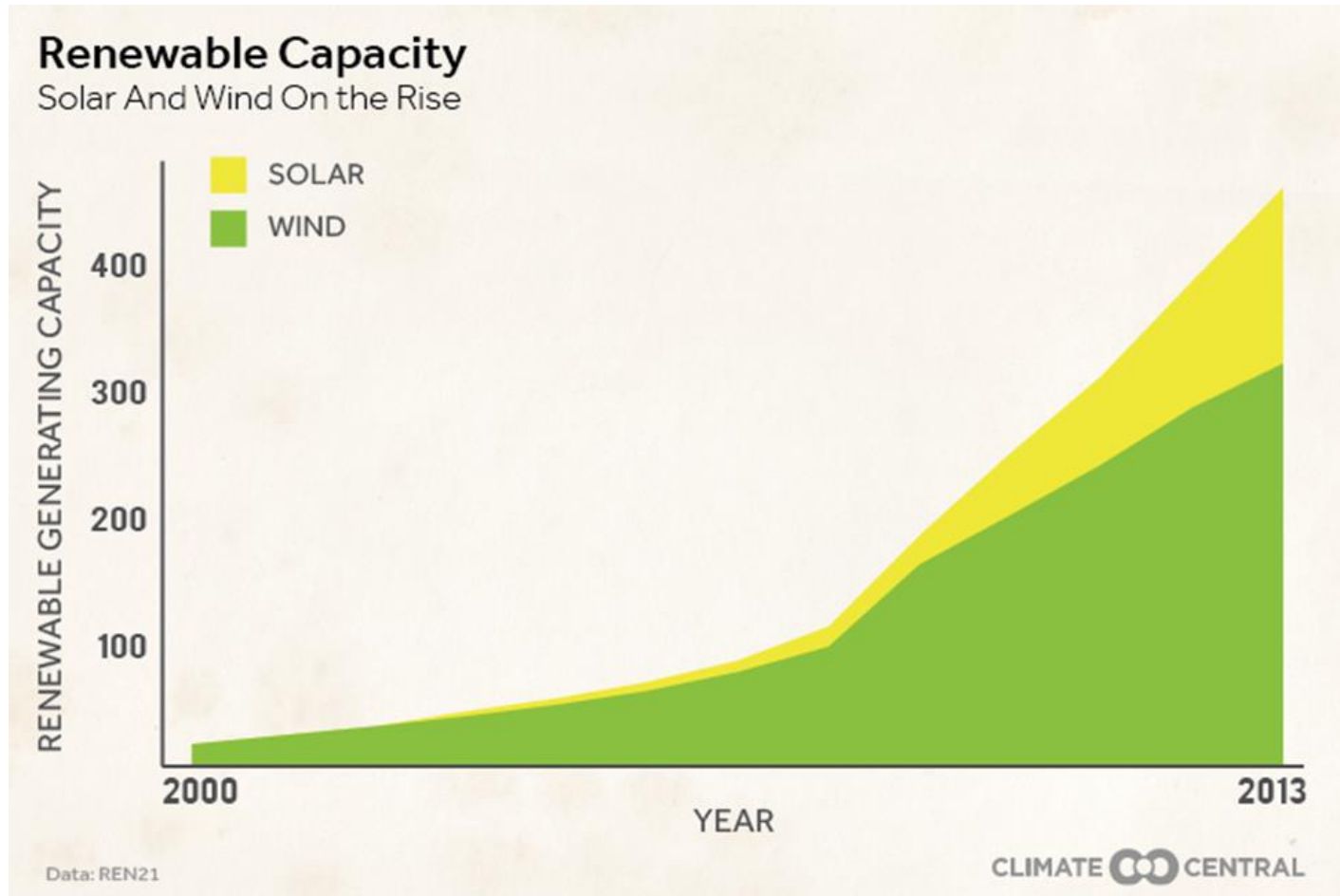
Exhibit 2

Welcome to the Terrordome... \$/MMBTU by Energy Type



Source: EIA, CIA, World Bank, Bernstein analysis

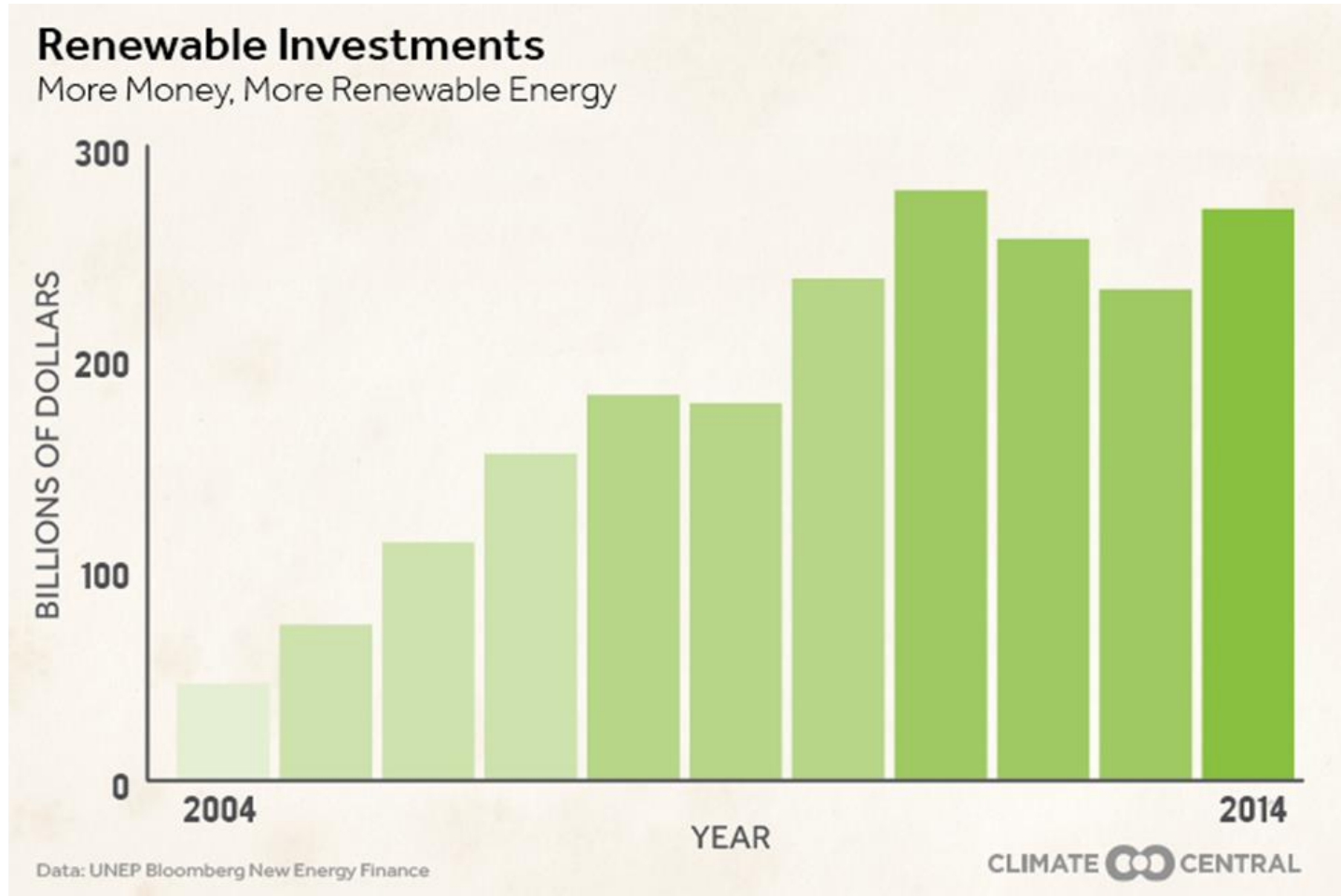
Explosive Growth of Wind & Solar



Source: <http://www.climatecentral.org/news/clean-energy-trends-earth-day-18916>



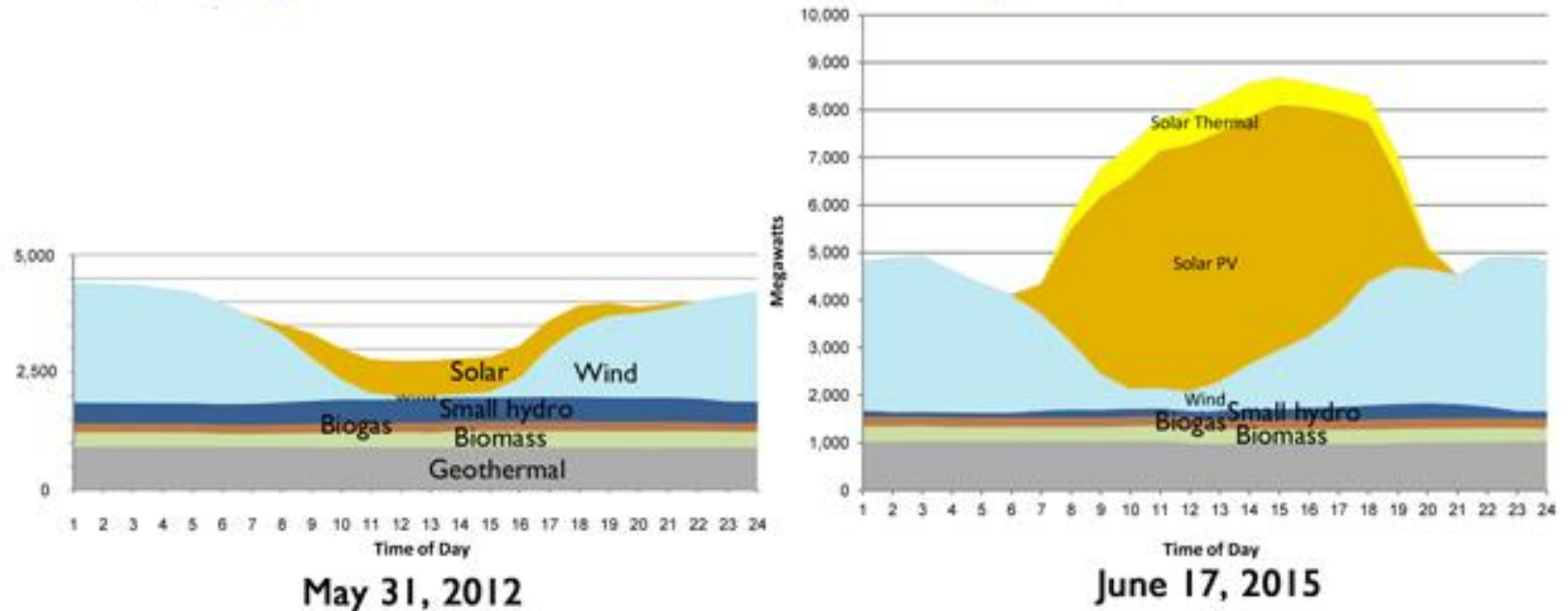
Less Money Purchasing More RE



Source: <http://www.climatecentral.org/news/clean-energy-trends-earth-day-18916>



What a difference three years can make: Renewable generation in California on two days of similar weather



Source: <http://www.climatecentral.org/news/clean-energy-trends-earth-day-18916>



City Pathways





Urban Clean Energy

- Unique and critical role of cities: ½ the world and 80% of Americans in cities—70% of global carbon emissions
- Energy Efficiency
- Local Distributed Renewable Energy
- Electricity Grid Innovation
- Clean Transportation



City-Led Clean Energy Innovation

- 100 Percent Renewable Cities
- Carbon Neutral Cities
- New Energy Cities



Bright Future: Clean Energy Transition is Accelerating



Subscribe to ClimateCast!

CLIMATECAST
The Week in Clean Energy Solutions



CLIMATECAST
The Week in Clean Energy Solutions



CLIMATECAST
The Week in Clean Energy Solutions



CLIMATECAST
The Week in Clean Energy Solutions



CLIMATECAST
The Week in Clean Energy Solutions



CLIMATECAST
The Week in Clean Energy Solutions



CLIMATECAST
The Week in Clean Energy Solutions



CLIMATECAST
The Week in Clean Energy Solutions



CLIMATECAST
The Week in Clean Energy Solutions



Thank you

Eileen V. Quigley
Director of Strategic Innovation

eileen@climatesolutions.org

206.443.9570 x 34 (office)

206.579.9644 (mobile)



Climate Solutions.
PRACTICAL SOLUTIONS TO GLOBAL WARMING

