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FSS

Contemporary Trends

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Chinese Activities in Northern America: A source of concern?

- Increase of Chinese investments in CAN in previous decade
 - Chinese investments worth of USD 15 bn. in 2010 in Alberta alone
 - CNOOC Ltd. takeover of Nexen (2/2013 – USD 15,1 bn.) and OptiCanada (11/2011 – USD 2,1 bn.)
 - Sinopec takeover of ConocoPhillips' shares in Syncrude (prominent company extracting oil from oil sands) – USD 4,6 bn.
 - 13 investment projects worth more than USD 1 bn. since 2007 in the US and CAN (1/4 in CAN)
 - in the US - joint-ventures, in CAN - takeovers of whole companies

Selected Chinese Investments in the US

Company	Target	Value (billion USD)	Ownership %
CNOOC	Unocal	18,5	100
CNOOC	Chesapeake Energy (2010)	2	33,33
CNOOC	Chesapeake Energy (2011)	1,32	33,33
Sinopec	Devon Energy	2,4	33,33

Chinese Activities in Northern America: A source of concern?

- Chinese investments do not stand out among other investments common in the industry
 - big IOCs invest around USD 20 bn. annually into exploration and production
- Not an issue until an exclusive relation with the source (supplier) is set
- Oil extracted through Chinese NOCs still flows mainly to the US market
- Chinese NOCs more prone to ship oil to the world market for greater revenues
- Most important receivers of Chinese FDI in oil and gas sectors are in Central Asia and Africa
- Still, Chinese activities are being closely observed
 - Chinese (CNOOC) bid to take over the UNOCAL comp. was rejected (2005)
 - the Nexen takeover (2013) was reviewed by US authorities

The UNOCAL case (2005)

- CNOOC offered USD 18,5 bn. for the UNOCAL comp.; Chevron offered USD16,5 bn.
 - UNOCAL as an important possessor of oilfields in N America and Asia
- The biggest case of FDI in the US history until then
- First Chinese bid to take over big US OC
- Public and political resistance (republicans)
- National security issue?
- CNOOC stressed its purely economic interest

The UNOCAL case (2005)

- Resistance backed by Republicans „...to protect American national security by ensuring that vital U.S. energy assets are never sold to the Chinese government.“ (Joe Barton, TX rep.)
- Opponents used the Exon – Florio amendment (1988) enabling administration to review and rejects foreign investments threatening national security
- Framed as a threat to national security with regard to shrinking world oil reserves and rising consumers

The UNOCAL case (2005)

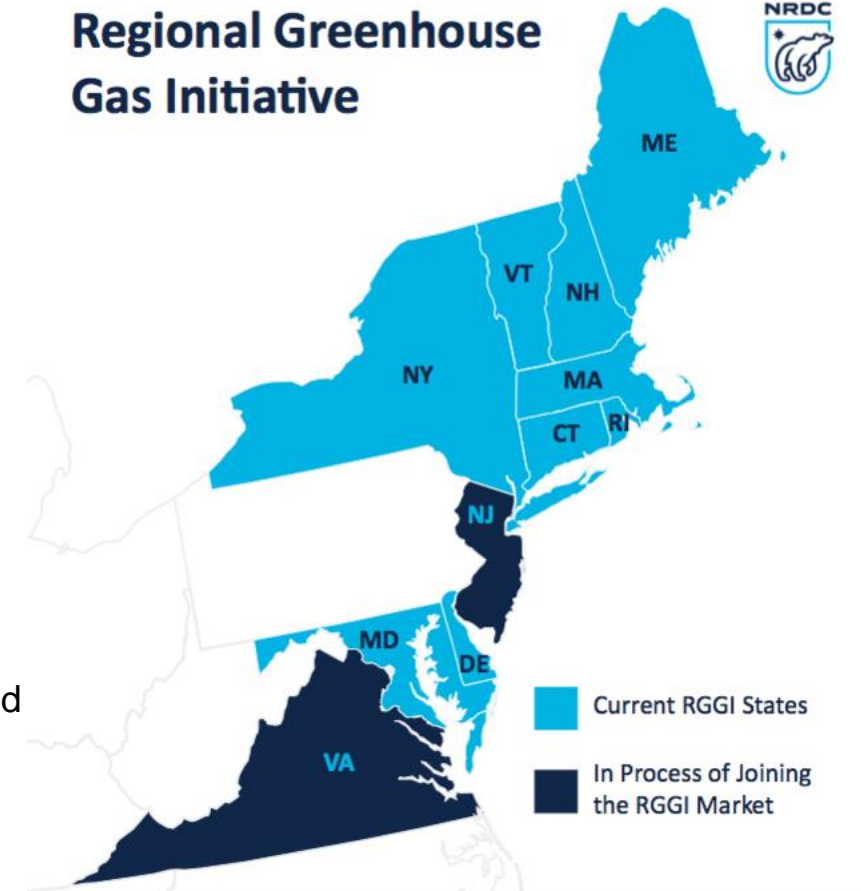
- UNOCAL was later taken over by Chevron for less than offered CNOOC
- Milestone in CHN – US mutual relationships – competitors in terms of securing energy supplies
- New international energy order?
 - Energy rich vs. energy deficient states?
- Pretext for Trump's trade war with China?

Major Chinese energy investments in Canada since 2009

Investment target	Value in USD	Investor
Teck Resources	1,5 bn.	China Investment Corp.
AOSC	1,9 bn.	PetroChina
Syncrude	4,65 bn.	Sinopec
Penn West Energy	1,25 bn.	China Investment Corp.
EnCana	2,21 bn.	PetroChina
Opti	2,1 bn.	CNOOC
Nexen	15,1 bn.	CNOOC

Climate Policy – Current Trends

- Changes to the climate policy under Donald Trump
 - support for greater use and extraction of hydrocarbons (e.g. Keystone XL)
 - Obama's Clean Power Plan (- 32% carbon emissions from PPs by 2030) repealed
 - Affordable Clean Energy rule much weaker
 - announced Paris Agreement withdrawal
 - Controversial picks for DoE and EPA (Rick Perry, Scott Pruitt, Andrew Wheeler)
- Apparent reverse of the trend set by previous administration(s)
- 'Trickle-down' effect on governmental bodies (incl. EPA)
- Decrease of carbon emissions thanks to changes in power generation (gas+RES vs. coal)
 - market beats the government's policies (incl. the 'revival' of coal)
- States and cities have been spearheading the policy-related activities; no comprehensive federal policy
 - State-level GHG reduction goals and carbon markets
 - 100+ cities and counties committed to 100% clean energy

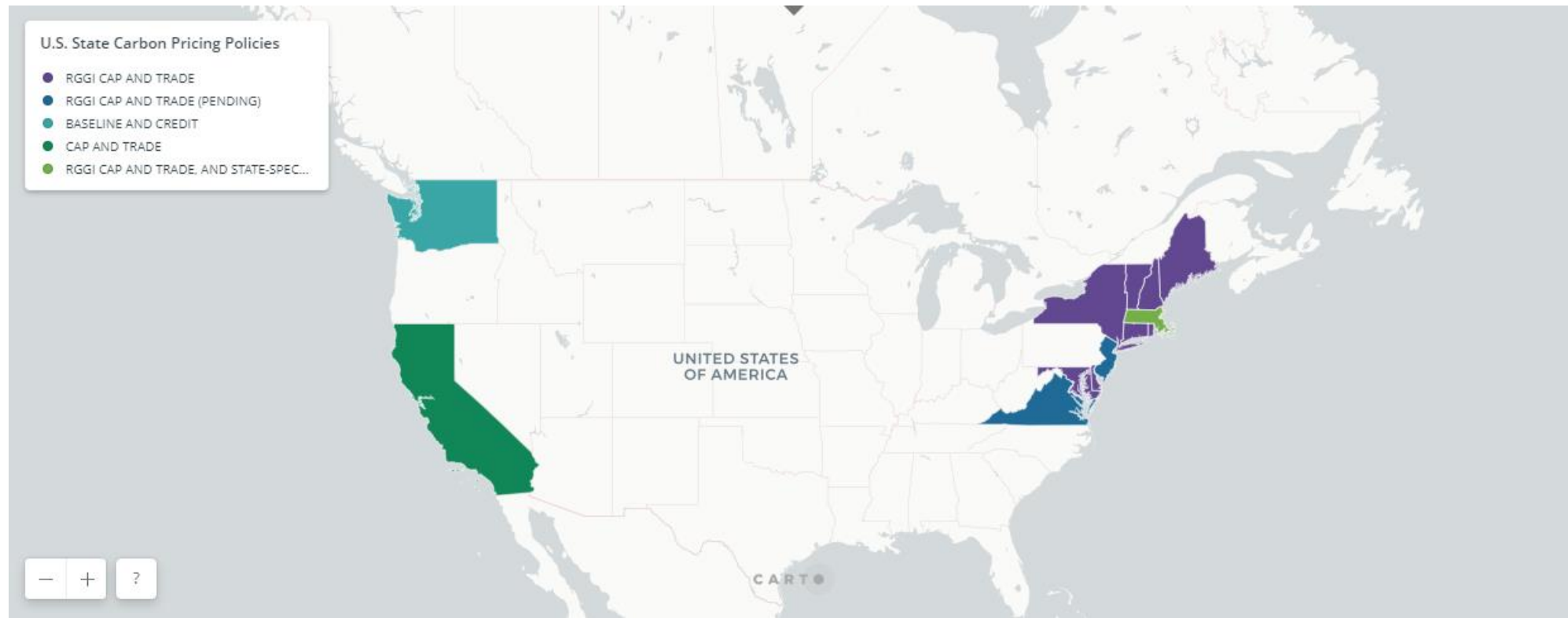


Climate Policy – Current Trends

- 2 cap-and-trade systems
 - Regional greenhouse Gas Initiative (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont) – electricity generation
 - Western Climate Initiative (California, Québec, Nova Scotia) – all fossil fuels-generated emissions
- +1 (de facto) defunct
 - Midwestern Regional Greenhouse Gas Reduction Accord (Minnesota, Wisconsin, Illinois, Iowa, Michigan, Kansas, Manitoba + observers)
- However, CO2 reductions mainly in efficiency and clean policies in power generation, not the C&T mechanism or other polluting sectors
 - Effect of coal-gas swap
- Both systems need to be stricter (excess capacity of allowances)
- Regional initiatives (transportation – TCI – New England and neighbours, etc.)

Climate Policy – Current Trends

- Two cap and trade systems
 - Regional Greenhouse Gas Initiative
 - Western Climate Initiative

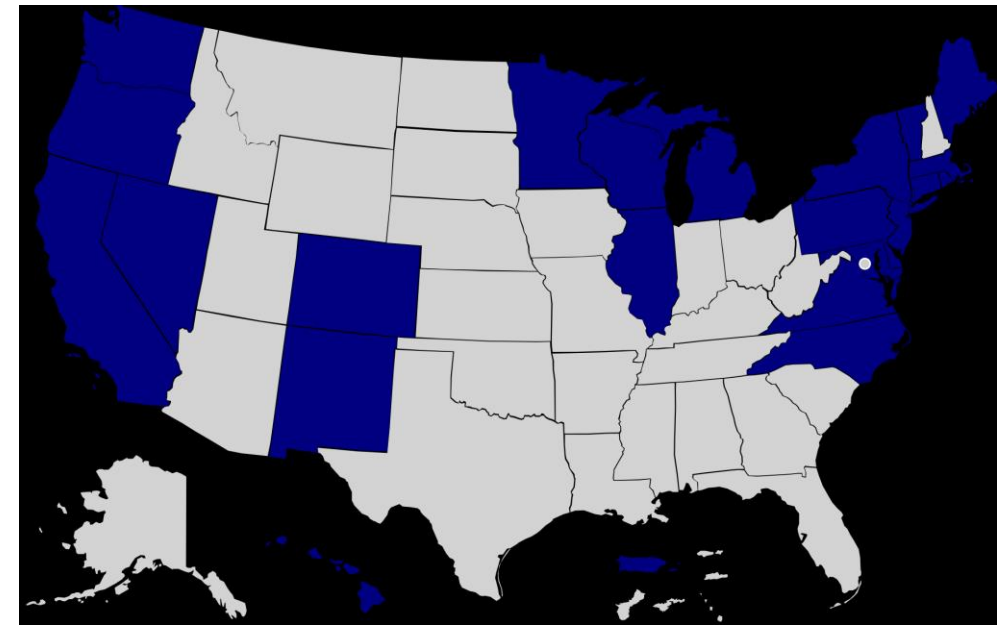


Climate Policy – Current Trends

- Great polarization on the issue of (man-made) climate changes
 - Party-dependent attitudes – (Reps. Vs. Dems.)
- Trump's administration has repealed a lot of previous policies
 - withdrawal from the Paris agreement
 - Clean Power Plan – criticized by Trump's administration for harming the industry - repealed and replaced by ACE
 - softened vehicle efficiency standards (light, medium and also heavy-duty)
 - relaxed restrictions on methane (O&G producers to regulate themselves!)
- Trump did so using executive orders – binding for federal bodies
- Many states decided to pursue even stricter goals that had been prescribed even before
 - incl e.g. Pipelines
- Ironically, thanks to the administrative's reserved attitude towards the issue, it became much more debated

Climate Policy – Current Trends

- Climate policies are now very much state-based rather than government-induced, states lead the way
- Climate Alliance – bipartisan (!) group of the most progressive states committed to GHG reduction, following the Paris Agreement regardless the federal government's stance
 - California, Colorado, Connecticut, Delaware, Hawaii, Maryland, Massachusetts, Minnesota, New Jersey, New York, North Carolina, Oregon, Puerto Rico, Rhode Island, Vermont, Virginia, Washington
 - Massive GHG reduction targets 75%+ compared to 1990 by 2045-2050 (or even net zero), up to 100 % RPS by 2045
 - Economy-wise would be 3rd country in the world
- 24 states (3/4 of the population) still subscribe to the Paris climate goals
- Regional cap and trade systems



Climate policy

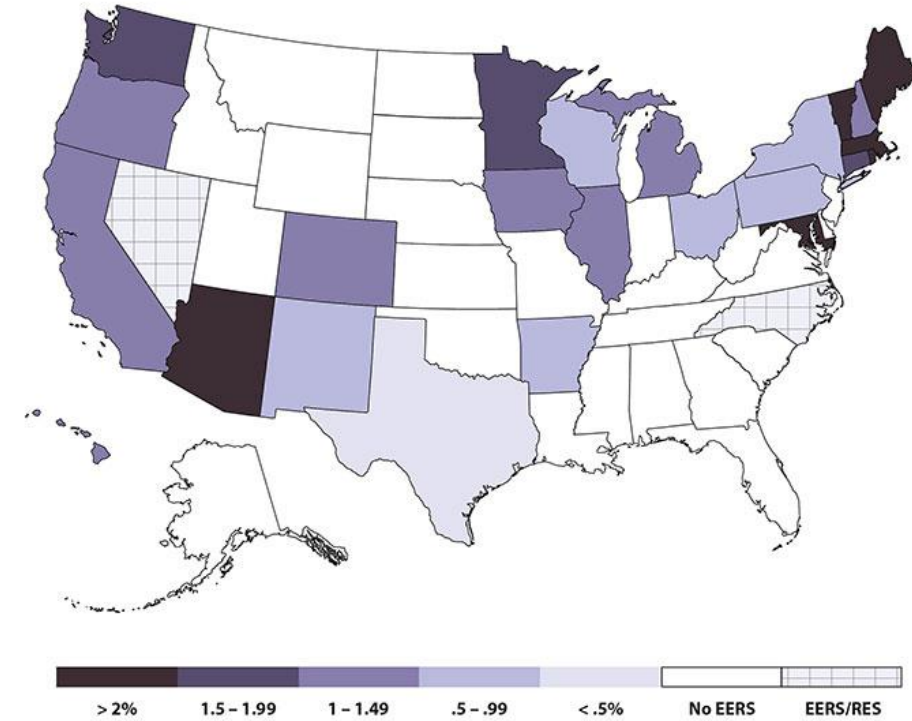
- ❑ Current changes sometimes contradictory to environmentally favourable approach (crisis of NPPs, cheap gas, relatively cheap coal, ...)
- ❑ BUT... increase of deconcentrated RES
- ❑ Climate policy is more efficient on state level – „Petri dish“ of new policies
- ❑ Voluntary initiatives (e.g. Energy Star)
 - ❑ Started as a federal light-saving policy
 - ❑ Emerged into a federal certification program of efficiency measures
 - ❑ ICT, home appliances, buildings, industry
 - ❑ Applied internationally (CAN, JPN, SUI, TAI); EU (expired 2018)
 - ❑ Certification for products subscribing to Energy Star measures, intended also for US market
 - ❑ Cut of federal funding?



Energy Efficiency

- Often overlooked ‘source’ of electricity
- Potentially, among the largest energy sources/pools
 - Growing focus on ‘weatherization’ (insulation, shading, etc.)
 - E.g. Pacific NW – growing population X declining electricity consumption since 2011 (thanks to efficiency and savings)
 - said to be 2nd biggest source of electricity in the region
- Standards for meeting energy needs by specific share of efficiency measures

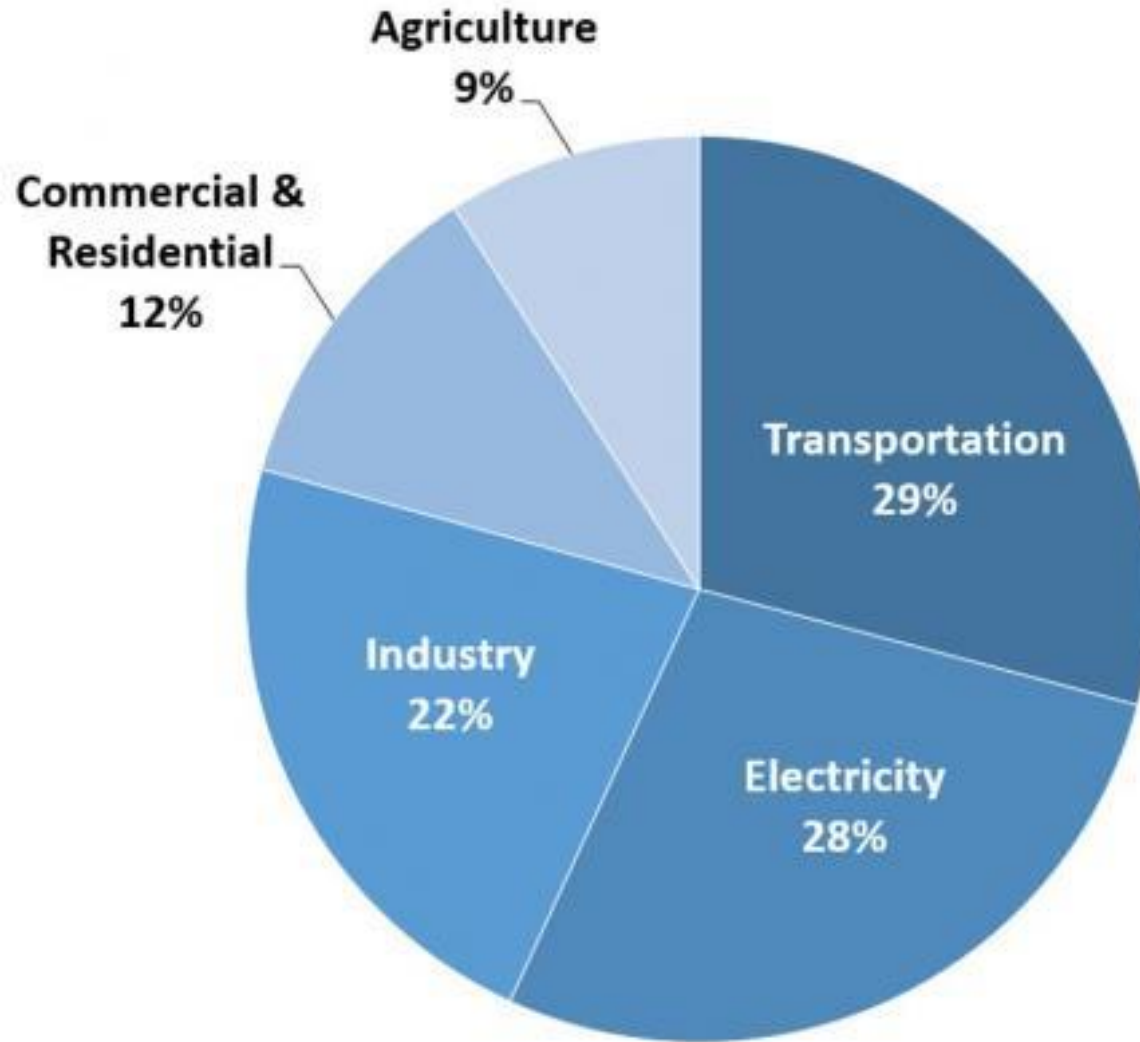
Energy efficiency resource standards by state
arranged by approximate annual electric savings target (2014 – 2020)



The Green New Deal

- Dems.-sponsored policy comprehensive proposal package addressing the issue of climate change and sustainability
- No full-fledged act, no concrete policy, rather a set of ambitious goals
 - Net-zero GHG emission scheme
 - Infrastructural investments
 - RES
 - Smart grids
 - Building upgrades
 - Curbing agricultural emissions
- Highly divisive issue (GOP vs. Dems) – criticized fore being ‘ socialist’, expensive, unrealistic and wasteful,
- Resolution rejected in 3/2019
- Remains as a policy driver for like-minded politicians and a ‘punching bag’ for opponents

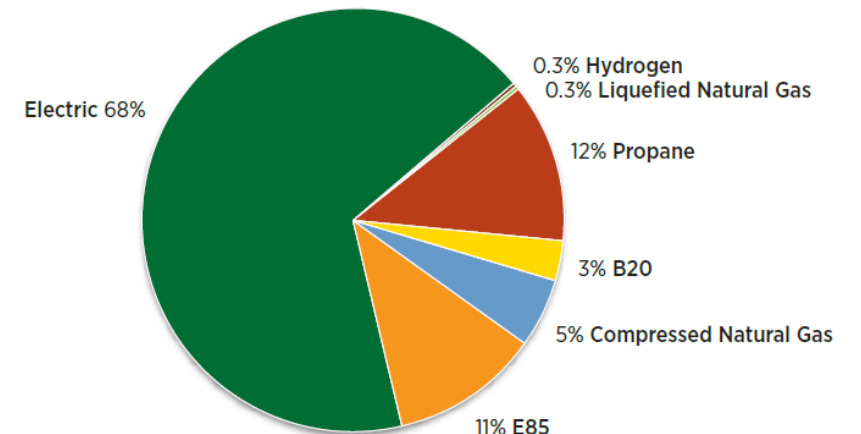
Total U.S. Greenhouse Gas Emissions by Economic Sector in 2017



Alternative fuels

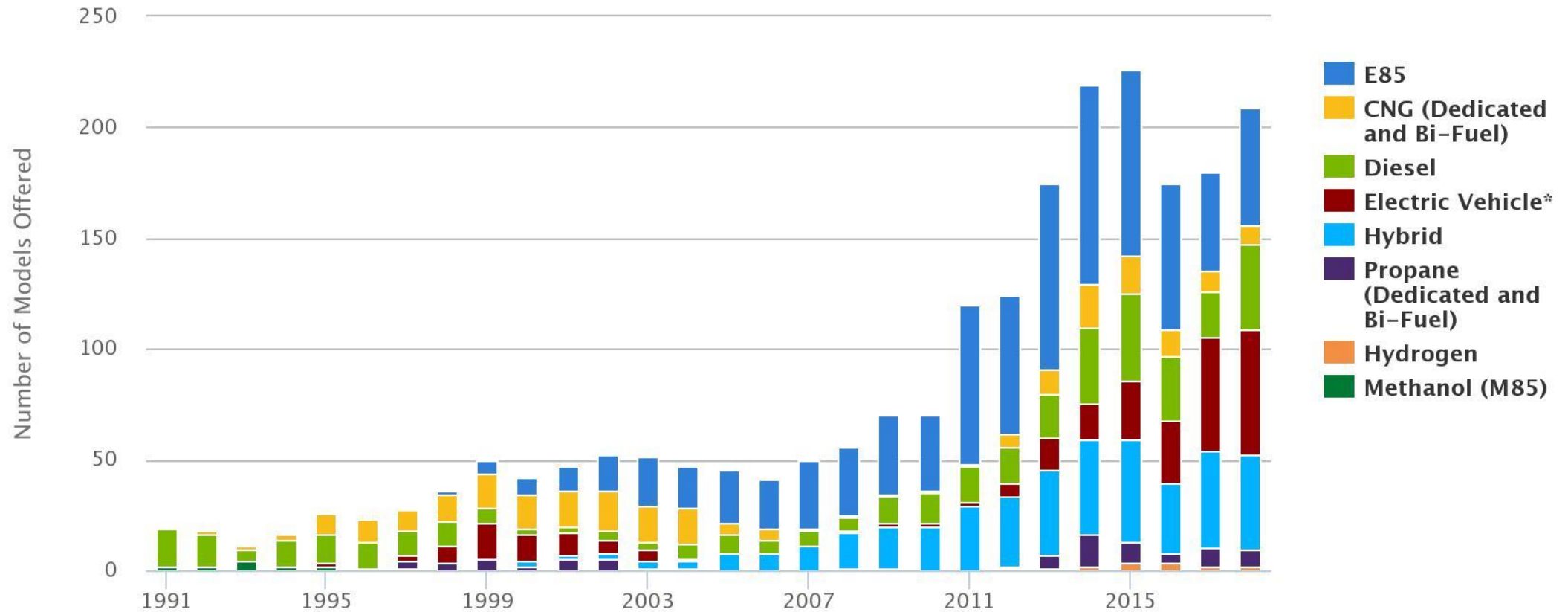
- Seemingly high number
- US as the leading world producer of ethanol
- Local and state projects to support electromobility (California)
- Electromobility and higher efficiency in transportation (issue of single-occupancy vehicles – almost ½ of all vehicles in big cities)
- City emissions – mainly transportation-related
 - Target of local policies (e.g. WA aims to exchange 50% of state fleet for EVs)

22,109 Alternative Fueling Stations in the United States



Alternative fuels

Light-Duty AFV, HEV, and Diesel Model Offerings, by Fuel Type



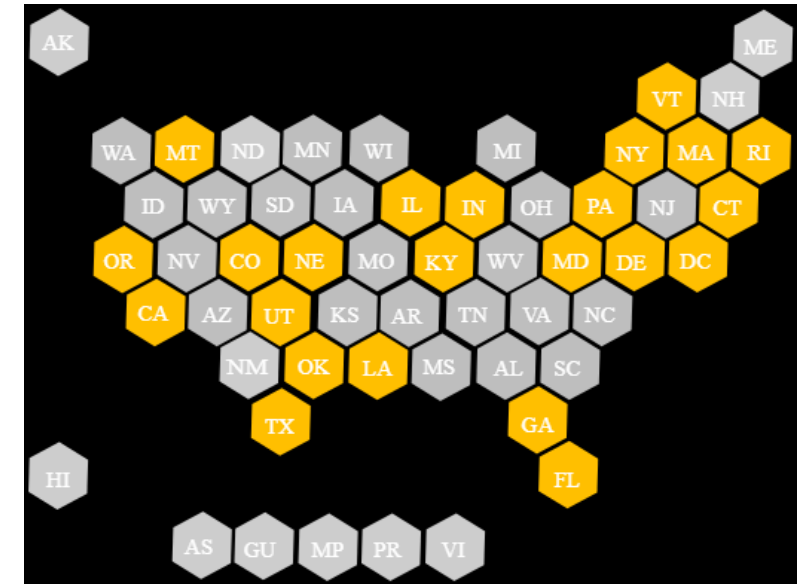
Last updated: January 2019
Printed on: August 1

Alternative fuels

- Alternative fuels/sources of mobility still rather marginal
- FlexFuel as the most viable solution
- Alternative fuels keep failing to offset rise of fuel sells globally
- Biodiesel has lower EROEI than gasoline
- Brasil as the top producer/consumer of biofuels – aims at exports to US
- Clearly no will to repeal high import taxes on biofuels – that would be a support for foreign farmers at the expense of domestic production – politically unacceptable

Electromobility

- Regression of policies on the federal level under the Trump's administration
- Federal incentives for EVs and PHEVs are being repealed
- Car efficiency measures are being softened even beyond what manufacturers demanded
- States lead the way in implementing incentives for alternative fuels, efficiency and saving measures
- <http://www.ncsl.org/research/energy/state-electric-vehicle-incentives-state-chart.aspx>
- VW settlement money partly invested into EV infrastructure
 - Environmental Mitigation Trust
 - Vehicle buyback

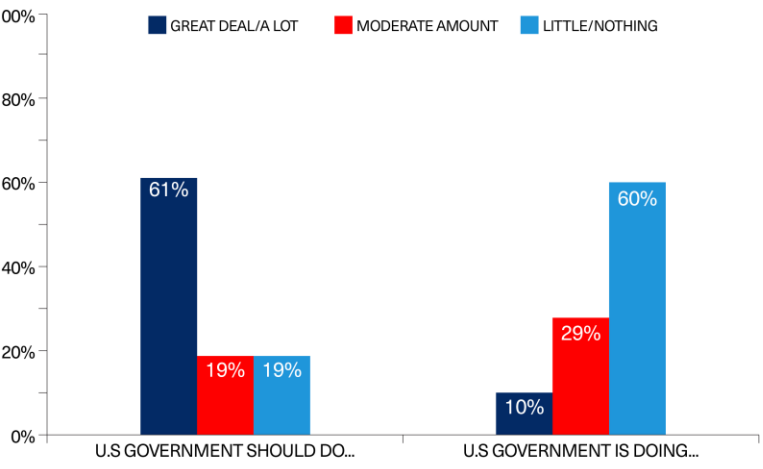


Climate Opinion Maps of US

- Is global warming actually happening?
- Is global warming caused by human activities?
- Should CO2 be regulated?

- <https://climatecommunication.yale.edu/visualizations-data/ycom-us-2018/?est=governor&type=value&geo=state>

GOVERNMENT ACTION TOWARD GLOBAL WARMING



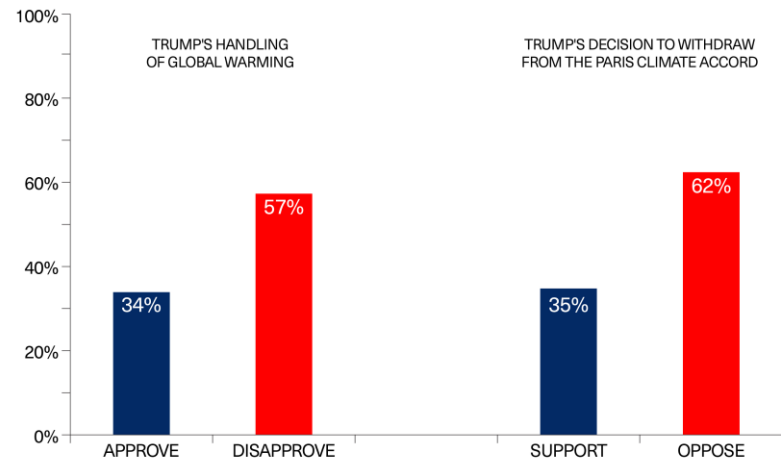
SOURCE: Stanford/ABC News/RFF poll abcNEWS

GLOBAL WARMING AND THE UNITED STATES

	U.S. GOVERNMENT SHOULD DO A GREAT DEAL/A LOT	GLOBAL WARMING IS A "VERY" SERIOUS PROBLEM FOR U.S.
ALL	61%	51%
DEMOCRATS	84	78
REPUBLICANS	32	25
INDEPENDENTS	63	48
LIBERALS	85	77
MODERATES	63	50
CONSERVATIVES	42	36
VERY LIBERAL	88	77
VERY CONSERVATIVE	33	27
AGE 18-39	70	61
50+	54	44
COLLEGE GRADUATES	65	56
POST-GRADUATES	71	66
NON-COLLEGE GRADUATES	59	50
WHITES	53	46
NONWHITES	75	62
BLACKS	81	71
HISPANICS	75	60
EVANGELICAL WHITE PROTESTANTS	40	32
NON-EVANGELICAL WHITE PROTESTANTS	53	46
WHITE CATHOLICS	59	46
NO RELIGION	72	66

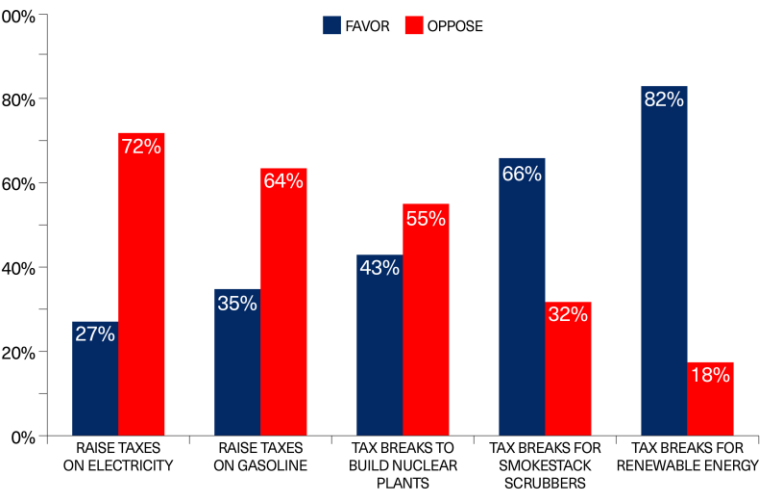
SOURCE: Stanford/ABC News/RFF poll abcNEWS

TRUMP AND GLOBAL WARMING



SOURCE: Stanford/ABC News/RFF poll abcNEWS

PROPOSALS TO REDUCE GLOBAL WARMING



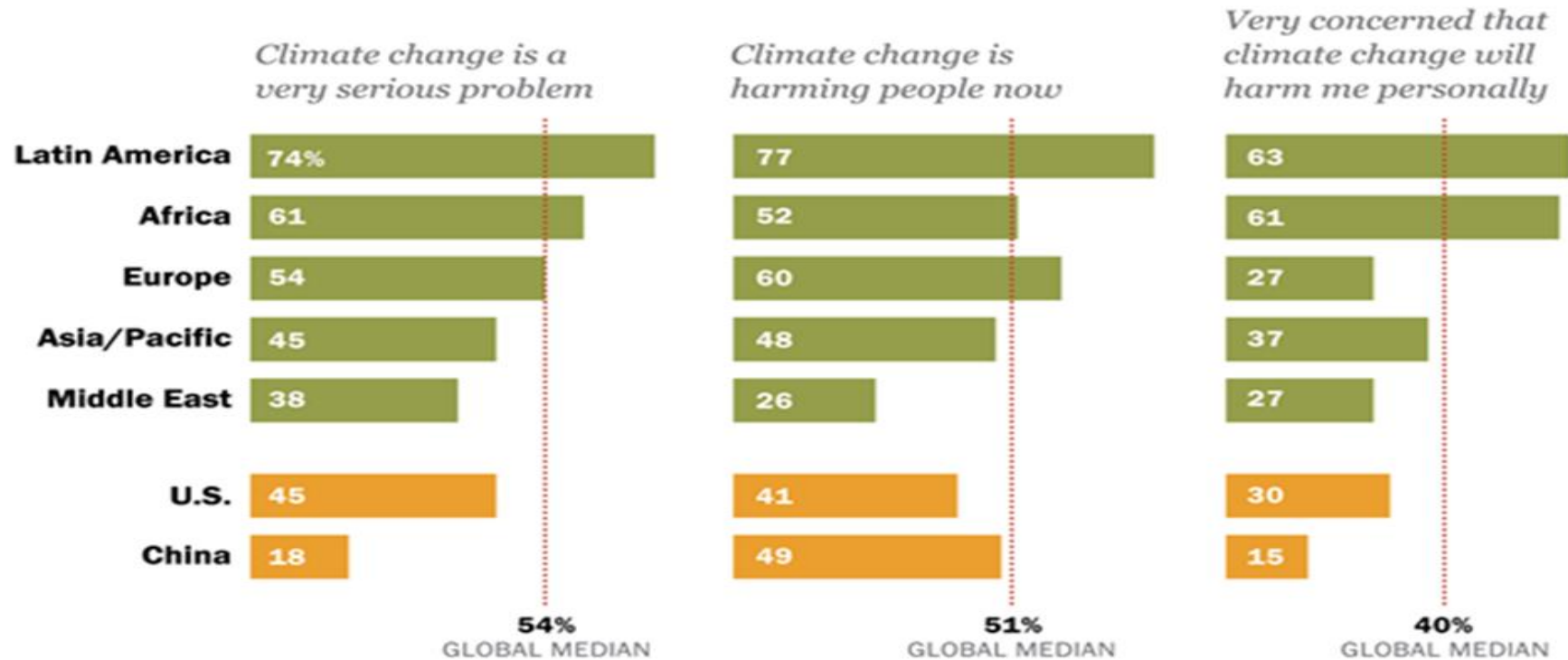
SOURCE: Stanford/ABC News/RFF poll abcNEWS

- party-based divisions
- Liberal/conservative
- Non-significant correlation to education
- Slight race-based correlation
- 59% think environment should be prioritised over energy production

Different to Europe? Not so Much...

Latin America, Africa More Concerned about Climate Change Compared with Other Regions

Regional medians

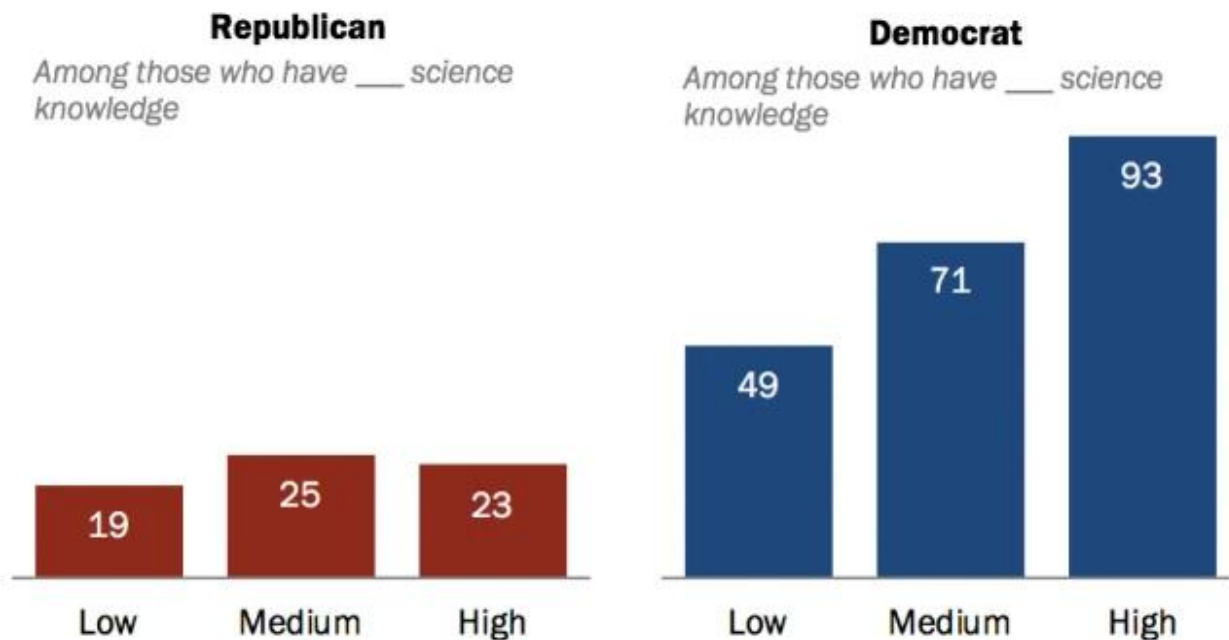


Note: Russia and Ukraine not included in Europe median. Asia-Pacific median includes China.
Source: Spring 2015 Global Attitudes survey. Q32, Q41 & Q42.

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Most Democrats with more science knowledge believe climate change is due to human activity, but there is no difference by science knowledge among GOP

% of Republicans or Democrats who say the Earth is warming due to human activity



Note: Beliefs about climate change include those who "lean" toward each response. Those who did not give an answer not shown. Republicans and Democrats include independents and other non-partisans who "lean" toward the parties. Respondents who do not lean to a political party not shown.

Source: Survey conducted May 10-June 6, 2016.

"The Politics of Climate"

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U.S. Should Place "More Emphasis" on Each Source of Domestic Energy Production, by Party ID

Do you think that as a country, the United States should put more emphasis, less emphasis or about the same emphasis as it does now on producing domestic energy from each of the following sources -- ?

	Republicans %	Independents %	Democrats %
Solar power	70	83	82
Wind	63	69	81
Natural gas	66	52	49
Oil	60	38	28
Nuclear power	47	34	24
Coal	40	24	22

March 5-8, 2015

GALLUP

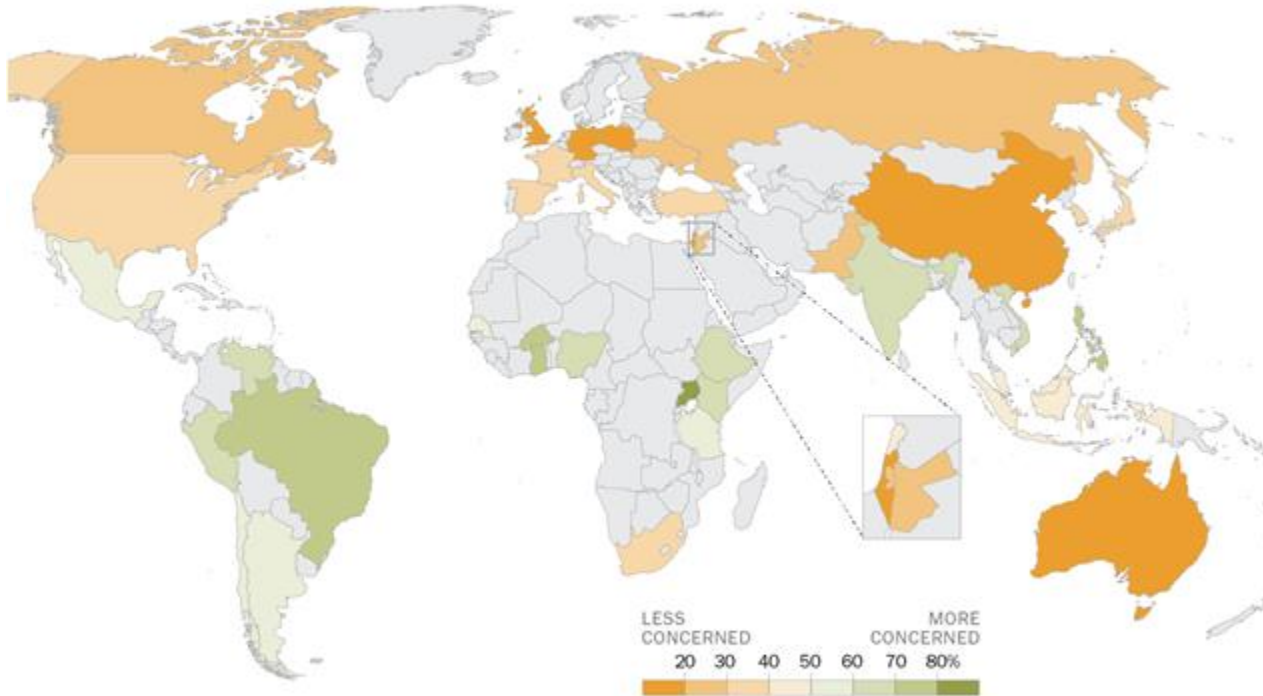
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Climate Opinion Maps of US

- Partisanship - not a US exception

Concern about Personal Toll of Climate Change Greatest in Latin America

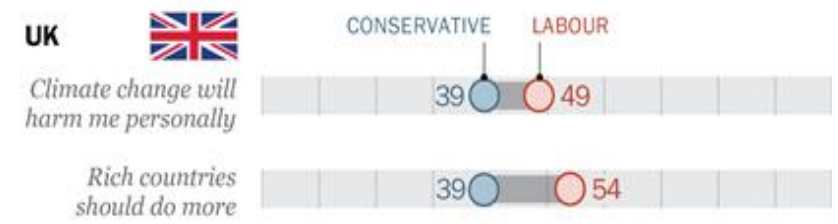
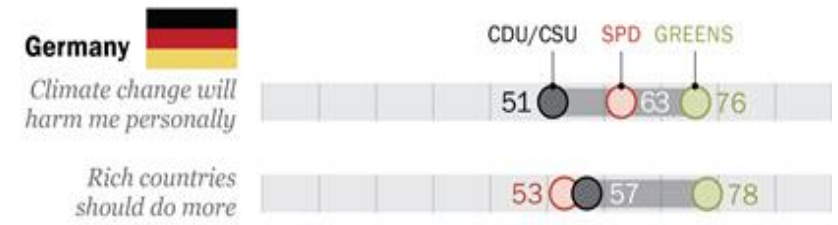
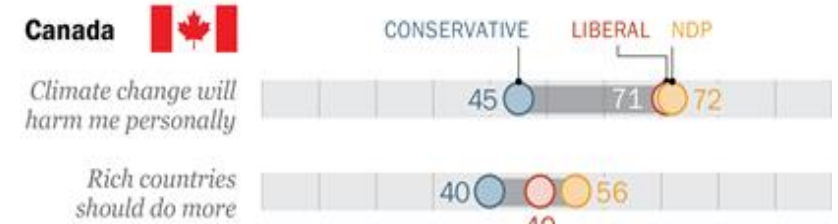
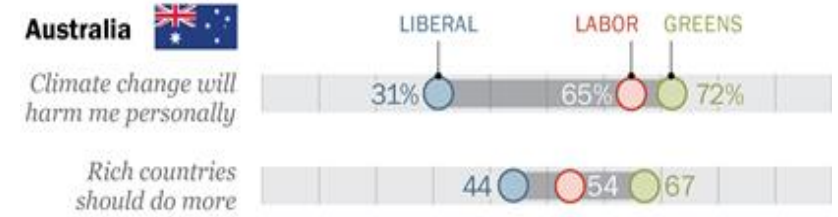
Very concerned that global climate change will harm me personally



Source: Spring 2015 Global Attitudes survey, Q42.

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Partisan Divide on Climate Change in Major Economies



Note: Dot color is color used by each party; it does not necessarily indicate ideological similarity.

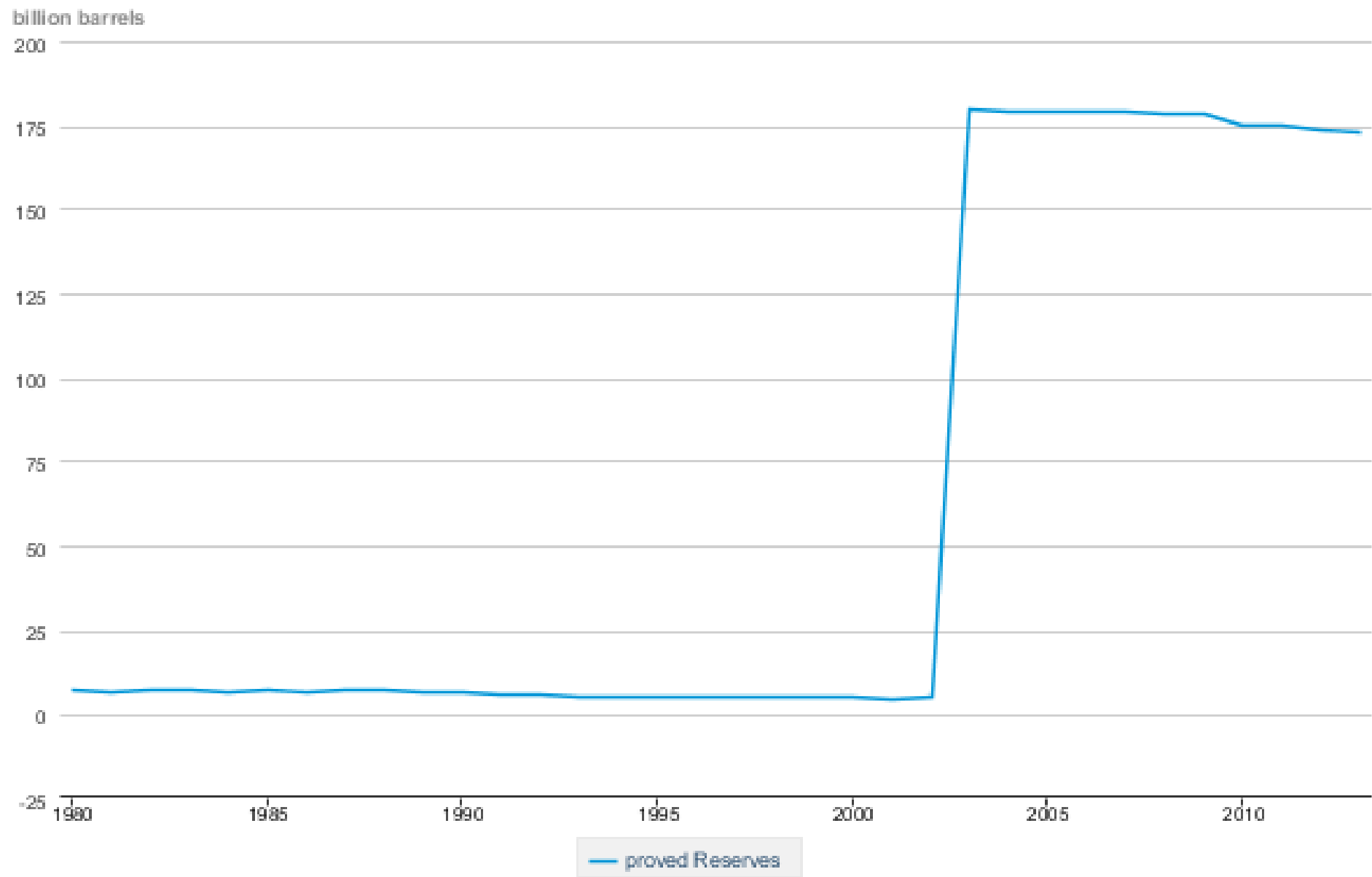
Source: Spring 2015 Global Attitudes survey, Q42 & Q44.

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Unconventional sources of oil in North America – oil sands (Canada)



Canada proved Reserves (1980-2013)





**Alberta's crude oil (left) feels and flows like asphalt or molasses.
(Courtesy of: Petrobank Resources).**

Unconventional sources of oil in North America – oil sands (Canada)

- 3 main areas (>140 000 km², 2x Czech Republic):
 - Athabasca (open cast)
 - Cold lake (partly in conventional sources)
 - Peace River (in-situ techniques)
- Canada – 3rd biggest proven reserves worldwide >170 BBL
 - Economically recoverable up to 170 Gbbl
 - Ultimately recoverable up to 315 Gbbl
 - Total volume (resources) up to 1,8 trillion bbl (est.)
- Cumulative oil sands production to date 9,6 Gbbl
- The biggest oil sand resources (along with Venezuela)
- The only significant area where oil sands are currently being developed
- Around 2/3 of total world reserves are in unconventional sources, mostly sands (heavy oil)

Unconventional sources of oil in North America – oil sands (Canada)

- Oil sands came online in early 2000s – thanks to the economy of scale and technical advancements
- Canadian sources were in decline since 1970s with view of becoming net importer after 2020
- Unconventionals >90% of current Canadian oil reserves
- Environmental issues of in-situ techniques, open cast mining, infrastructure, energy intensity, EROEI
- http://svs.gsfc.nasa.gov/vis/a010000/a010800/a010838/athabasca-540-MASTER_high.mp4

Unconventional sources of oil in North America – oil sands (Canada)

- Influx of US (light) crude to CAN refineries
- from 24 000 bbd to 100 000 bbd
- Decreasing demand for CAN heavy crude, lacking infrastructure (Keystone XL)
- Asian markets – issue of infrastructure

- Keystone XL:
- <https://www.youtube.com/watch?v=mflq8whDQDU>
- <http://www.youtube.com/watch?v=qrROgJpNJH0&feature=youtu.be>

Kexstone XL

- Seemingly dead after cancellation by the Obama administration
- Revived by Trump
 - one of the key points of Trump's energy policy plan ('America First Energy Plan')
- Still contested on the level of state regulators
- Questionable economy
- Investors rather reluctant
- Refineries at the gulf coast have been switching to lighter crudes anyway
 - as a response to the demand coming from US
- Keystone XL is not the only game in town – there are other ways how to get the oil to the refineries



