



A Citizens'  
Solutions Guide

# Energy

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# Where Things Stand

While most of us probably take it for granted, energy plays an integral role in our daily lives—in commuting to work, running the dishwasher, charging our mobile devices, and cooling an office building, not to mention the manufacture of every product we buy. For better or for worse, nearly everything we do requires energy, and we use more energy now than we ever have before.

Meanwhile, our energy situation is changing rapidly. Our current energy outlook is far different than what it was just a few years ago, due mainly to a significant surge in domestic oil and natural gas production. In 2010, we imported less than 50 percent of the oil we used, for the first time in 13 years, and that trend continued in 2011. Still, this hopeful bit of news is itself fraught with tradeoffs, mainly environmental.

In fact, there are a lot of critical tradeoffs we will need to confront as we decide how to move forward on energy policy. Many advocate for things like developing infrastructure and technology for renewables like wind and solar power, modernizing our energy grid, or developing “clean coal” technology. The cost of these endeavors has the potential to be massive. In our fragile economy, are we prepared to widen our federal budget deficit for our energy needs?

Our energy policy also has the potential for creating a lot of jobs. People talk about “green jobs” that will come from developing infrastructure for renewable energy, but a lot of jobs (some say more) can also be created from upping our domestic production of oil and natural gas—we’ll need people to build the pipelines and do the drilling. But again, these job creation strategies may contribute significantly to the deficit.

## The Triple Threat

Understanding the tradeoffs we need to consider for our energy choices is critical. The difficulty is that energy policy represents a “triple threat” of challenges to confront, each daunting in its own right:

### Economics

While the price of oil is down from this time last year, most analysts say it will keep going up over the long run. World energy demand is projected to jump nearly 40 percent over the next 20 years, as countries like China and India require more fuel for their booming economies—increasing our competition for this vital resource. Meanwhile, our economy remains fragile for the foreseeable future; thus, we must figure out how to keep energy affordable.

### Energy Security

While our energy production is on an upswing and our outlook on oil and natural gas availability has brightened, the country’s demand for energy still currently outpaces production, and that gap is expected to widen. Significant amounts of our energy sources, especially oil, come from more problematic nations. Many experts worry this leaves us vulnerable to supply disruptions and yoked to unstable or even hostile regimes. This is a visceral concern for those of us who remember the long lines at the gas station during the OPEC oil crisis of the 1970s. Some economists even say that a spike in oil prices caused by a confrontation with Iran is the biggest current threat to the U.S. economy.

### Environmental Impact

Our increase in domestic energy production is due mainly to hydrofracking (also known as hydraulic fracturing, or simply fracking). Fracking is a method of extracting natural gas and oil from shale rock

deep under the ground. Fracking has its benefits. It has decreased our dependence on foreign energy sources. It has increased jobs, both directly and because the fewer dollars we send overseas, the more we can put into investment and job creation. Also, by making natural gas more available and affordable, we've been able to move away from coal for electricity—and coal is the worst contributor to global warming. But there's also a lot of controversy surrounding hydrofracking's environmental impact; critics say that it unearths naturally occurring carcinogens and radioactive elements, which then contaminate our water supply.

When it comes to domestic energy production, we have additional environmental considerations to weigh as well. Most experts say nearly all of the remaining oil reserves we have are in remote locations, like offshore and in Alaska. Drilling will have repercus-

sions on the preservation of our forests and the protection from pollution of our air, water supplies and wildlife. We have seen significant pushback from environmentalists against the Keystone Pipeline in Alaska, for example. The Deepwater Horizon explosion and oil spill in the Gulf of Mexico also increased wariness against domestic ocean drilling.

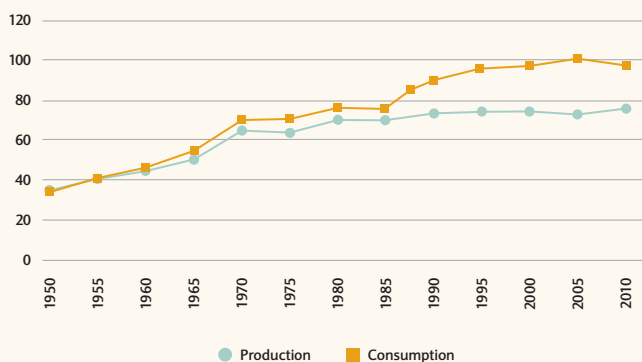
Finally, there's the question of global warming. About 6 in 10 Americans don't think global warming will have a serious impact on them during their lifetimes; however, scientific consensus is that temperatures are rising and at a faster rate than ever before. Scientists believe the impacts of climate change could include a host of negative occurrences, including coastal flooding, extreme weather and drought, not to mention the resulting social instability in many countries, especially poor ones. Groups like the Intergovernmental Panel on Climate Change warn that it

is no longer a question of whether world temperatures will increase as a result of global warming; it's a matter of how much. Eleven of the 13 hottest years on record have occurred since 2001. Reducing our reliance on fossil fuels is fundamental to controlling the greenhouse gas emissions that scientists say are causing global warming.

Not everyone agrees on the extent to which each of these issues is a threat or what government in particular should do to address them. But there is a much broader consensus that the United States needs diversified, stable, and affordable sources of energy in order to protect our economy and our way of life. Energy may seem complicated, but we don't need to be experts to be able to weigh the options—we just need a few basic facts to understand the tradeoffs and consider our solutions. Here are a few things that we do need to know.

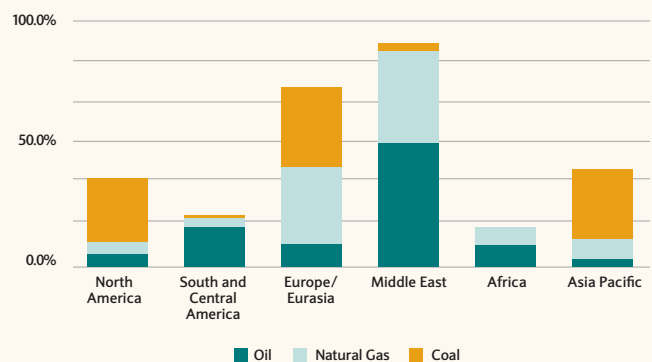
### Energy Consumption Exceeds Production

Historical and projected levels of U.S. energy production and consumption, in quadrillion Btus, 1950-2010. Source: "Annual Energy Review 2010," October 2011, Energy Information Administration.



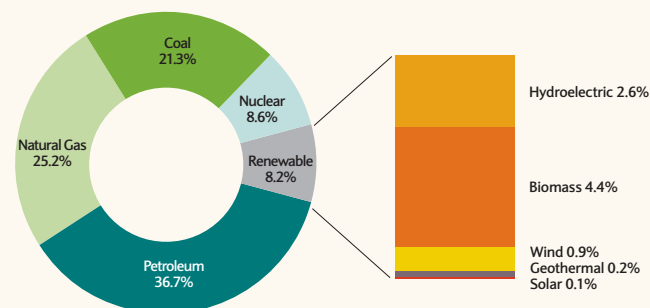
### World reserves of fossil fuels

Proven reserves of oil, natural gas and coal as percentage of world total, at the end of 2010. Note: North America includes the United States, which comprises 2.2% of total world oil reserves, 4.1% of total world natural gas reserves and 27.6% of total world coals reserves. Source: "BP Review of World Energy," June 2011, BP.



### Sources of Energy

Energy sources as a percentage of total U.S. consumption, 2010. Note: Based on preliminary 2010 data. Biomass includes biofuels such as ethanol and biodiesel. Source: "Annual Energy Review 2010," October 2011, Energy Information Administration.



## Key Facts You Need to Know About Energy

**The U.S. population is growing—meaning that our energy consumption is as well.** On a per person basis, our consumption levels are not too much higher than what they were in the late 60's—mostly through technology that has made our cars and appliances more energy efficient than ever. However, we're using a lot more energy as a society. Energy consumption in the U.S. has nearly tripled in the last 60 years, due mainly to population growth—there are nearly 135 million more people in the U.S. today than in 1960. We're also driving more than ever and using more technology than any generation before us. Even though fuel efficiency standards have been bumped up twice in recent years, the number of vehicles per household increased by 66 percent between 1969 and 2009. And it's important to recognize that Americans have one of the highest per person use of energy rates in the world.

**World energy demand is expected to increase by nearly 40 percent.** This increase is driven mainly by economic development and the rising standards of living in China and India and other countries. In many respects, this is a positive development. More people

around the world have better transportation, better housing and better communications, but that also takes more energy. We're competing with these growing nations for the energy that's available. This fact alarms a lot of experts, and you should be concerned too. By simple laws of supply and demand, this means we'll be paying higher prices.

**Most of our energy—83 percent—comes from fossil fuels.** Fossil fuels—petroleum, natural gas and coal—not only emit carbon dioxide and other greenhouse gases, they are also nonrenewable sources of energy, meaning they will all run out one day.

**Renewable energy has serious fiscal drawbacks—and we're nowhere near ready to depend on it at a substantial level.** The cost of developing infrastructure and technology for renewable energy sources is much steeper than most recognize. And, even if we did decide to invest in renewable energy, it will be decades before we can produce wind and solar power at reasonable prices and in enough quantities to supply the electricity we need. It will also be decades before our energy grid is ready to handle them. Any substantial transition to renewable energy will be a massive and difficult undertaking.

## Where Do We Go From Here?

The country is in need of some concrete solutions, and fast. There are plenty of new ideas in the pipeline—from technological innovations like clean coal technology and hydrogen fuel cell vehicles, to policy ones like energy efficiency standards and a gas tax, to fiscal ones like investing in our country's infrastructure by improving our public transit systems and modernizing our power grid. There are many practical solutions to our energy problems being discussed, no matter where your political views lie. The trick is to consider our values and priorities, decide which options are most environmentally and economically viable, and then weigh the costs and tradeoffs needed to make them work.

Every form of energy has tradeoffs. To help you weigh those tradeoffs, let's look at some key facts on our main energy sources:

ENERGY SOURCE	HOW IT'S USED (Nearly 70 percent of energy in the U.S. is used for either transportation or electricity.)	HOW MUCH DO WE HAVE?	WHAT'S GOOD?	WHAT'S BAD?
<b>Petroleum</b>	We use oil mainly for <b>transportation</b> . 71 percent of the oil we produce goes to fueling how we get around, and <u>93 percent</u> of the energy we use for transportation comes from oil!	The U.S. has <u>2.2 percent</u> of the world's proven oil reserves. (To give this some global context, the Middle East has 54.4 percent of the world's proven oil reserves. Iran alone accounts for 10 percent.)	We have stepped up oil production in the past few years, and are moving away from dependence on foreign oil.	<b>Supply:</b> Oil is a fossil fuel—meaning it will run out one day. The world's proven oil reserves are estimated to be <u>1.5 trillion barrels</u> . Some experts say that at the rate we're going, we could use up another trillion in about <u>30 years</u> . <b>Environment:</b> Oil also releases greenhouses gases, causing global warming.
<b>Coal</b>	We use coal mainly for <b>electricity</b> —nearly all of the coal consumed in the U.S. is used for <u>generating electricity</u> . And coal generated <u>nearly half</u> of all of our electricity in 2011.	We possess the world's largest share, <u>27.6 percent</u> of proven coal reserves, with Russia and China a distant second and third.	Coal is in pretty abundant supply in the U.S. Coal is fairly cheap to produce, and, while it is finite, there's still a good deal of it to go around.	<b>Environment:</b> Coal is the worst offender when it comes to carbon emissions, and the leading contributor to global warming. There is significant effort afoot to develop clean coal technology, but most experts believe that this kind of breakthrough is still many years off.
<b>Natural Gas</b>	It generates almost a <u>quarter of the country's electricity</u> , and is the main source of heat in more than <u>half of U.S. homes</u> .	The U.S. has <u>4.1 percent</u> of the world's proven natural gas reserves. Slightly better than our claim to the world's oil, but still minuscule.	It's cleaner than other fossil fuels; it doesn't emit quite the same in carbon emissions that oil and gas do.  Thanks to advances in drilling methods, including fracking, <u>we've seen a rise in recent years in the production and consumption</u> of natural gas.	<b>Environment:</b> We derive natural gas mainly through fracking. Critics say fracking endangers the water supply, and want it stopped or more heavily regulated. But if we move away from natural gas, we would need to use either more coal or nuclear, because it will take decades before we have enough solar or wind power to take its place.
<b>Nuclear</b>	Nuclear power is the source of about <u>20 percent</u> of all U.S. <b>electricity</b> .	The U.S. holds <u>4 percent of the world's known recoverable uranium</u> (from which nuclear energy is derived).	Uranium is a nonrenewable, but it burns cleanly and is in relative abundance.	<b>Environment:</b> The production of nuclear energy creates radioactive waste, and we still haven't solved the problem of what to do with that waste. <b>Public Resistance:</b> Nuclear power has a good safety record compared to other energy technologies, but <u>nearly 6 in 10 Americans oppose building new power plants</u> .
<b>Renewables</b>	Renewable energy sources include wind, solar, hydroelectric, and biomass (which includes biofuels, such as ethanol). All of these sources when lumped together make up a very small portion of our overall energy use— <u>about 9 percent</u> . Half of the renewable energy we produce generates <b>electricity</b> .	These energy sources are renewable, so we have an unlimited supply, assuming we have wind, sun, water and, for biomass, plants, trees and garbage. Obviously some parts of the country are more suited for certain renewables than other.	Renewable sources of energy have a minimal impact on the environment, they can be developed domestically, and unlike fossil fuels, they won't run out.	<b>Cost:</b> Building the technologies we need to support renewable energy – wind turbines and solar panels, for example – costs a lot. <b>Sustainability:</b> Our aging energy grid isn't ready to convert renewable sources to electricity. <b>Natural limitations:</b> Renewable sources only work well when, for example, the sun is shining or the wind is blowing, so for now, we need back-up energy sources which would be either coal, natural gas, or nuclear.

Adapted from Scott Bittle and Jean Johnson, *Who Turned Out the Lights?* (New York: HarperCollins, 2009) 77-80.

# Approach One

**Move away from fossil fuels as quickly and as safely as we can. This will protect the environment and in the long run will give us cheaper and more reliable energy sources.**

*Make major investments in developing the technology and building the infrastructure for our country's move towards clean, alternative energy. Meanwhile, pass legislation that limits our country's use of carbon-emitting fossil fuels.*

We've already done irreparable damage to the environment in the form of greenhouse gases that contribute to global warming. Let's limit any further harm to the Earth by curbing our use of nonrenewable fossil fuels and developing the necessary resources and technology to embrace renewable forms of energy.

## **This should be done by:**

- Making federal investments in the research and development of all renewable energy sources, like hydroelectric, solar, wind, and geothermal and other clean-burning fuels.
- Setting a federal limit on and taxing carbon emissions. Manufacturers will have a financial incentive to emit less and we could address our federal budget challenges and protect the environment at the same time.
- Raising the gas tax and requiring car manufacturers to make vehicles more fuel-efficient.
- Limiting offshore drilling, fracking and other types of energy exploration in areas that cause damage to our most precious natural resources.

## **Arguments for:**

- If you consider the serious costs of global warming and pollution, as well as the fact that our fossil fuels will one day in the not-too-distant future run out, there's no question that a green economy is the best solution.
- Someone is going to build the world's wind turbines and solar panels. In fact, we've already faced some competition with China in this area. If we don't start investing in development and manufacturing of new technology, we'll lose out.
- By staying ahead of the curve on alternative energy, the U.S. is looking to the future. We can be a global leader on this front, and serve as an example to the rest of the world.
- These measures may pose a significant up-front cost, but over the long run, they will end up saving us money—and saving our environment.

## **Arguments against:**

- We are living in the aftermath of one of the worst financial crises our country has ever experienced, and we have a ballooning national debt. Our government simply cannot afford the huge costs involved.
- Likewise, Americans on the whole are strapped and simply cannot afford to make drastic lifestyle changes—or spend more at the pump. Furthermore, environmental regulations impose costs that are passed on to consumers.
- The government is terrible at subsidizing renewable energy and has already shelled out taxpayer money to green-energy companies that subsequently went belly up. Just look at the Solyndra debacle—after the government sank half a billion dollars into the company, it went bankrupt and laid off its workers without severance pay.
- We don't know what approach is most cost effective—relying on renewable energy, regulating fossil fuels, using a mix of the two, or focusing on energy efficiency—and markets, not the government, should decide that. Subsidizing some forms of energy and not others creates an inaccurate basis to make that judgment.

# Approach Two

**Make sure we have enough affordable energy now to support our economy and ensure our energy security.**

*Focus on producing domestically more of the affordable fossil fuels we depend on now – coal, natural gas and oil – while also investing in alternative fuel development.*

In an age when there is so much uncertainty around the world, and when our economy needs all the help it can get recovering, we simply have to make this our first priority. The U.S. already produces an abundant supply of energy

from fossil fuels and possesses the resources and ingenuity to further develop renewable sources as well.

## **This should be done by:**

- Increasing domestic production of coal, natural gas and oil and investing in the development of alternative fuels like ethanol and other biofuels, as well as liquefied natural gas.
- Opening up federal lands to drilling for oil and gas. Easing restrictions on offshore drilling and fracking. Investing in new technology in drilling techniques that allow us to drill faster, deeper, cleaner and with minimal impact on the environment.
- Investing in the research of clean coal technology. Coal has long been a staple of our country's energy infrastructure. It is cleaner than it used to be and is in abundance in the U.S.; let's use it to our benefit while also supporting current efforts to develop carbon capture and storage technology to reduce coal's carbon footprint.
- Building more nuclear power plants.

## **Arguments for:**

- Not only will increasing the domestic supply of fossil fuel energy help us keep energy affordable and reliable, it's an effective way to create jobs – good, well-paying jobs.
- The U.S. has reasonably large supplies of oil and natural gas but we haven't done a very good job of developing them and putting them to use. The environmental dangers of drilling, mining, fracking, and pipelines have been exaggerated, especially given the technological improvements the industry has made in recent years.
- Making it easier to drill for oil and natural gas will bring down costs. Natural gas is especially advantageous because it is cleaner than other fossil fuels.
- Nuclear energy doesn't contribute to global warming and has the potential to be an affordable, reliable source of electricity.
- We're a long way off from producing renewable energy at in viable quantities at cost-effective rates. This is an approach we simply must explore.

## **Arguments against:**

- The potential environmental disruption and the dangers of pipeline construction, fracking and offshore drilling are simply too high to offset the economic benefits. Just look at the Deepwater Horizon spill of 2010 in the Gulf of Mexico—the worst oil spill in the history of our country. We're still unsure of the extent of damage that spill did to the ecosystem.
- Relying on our existing sources of energy means continuing to consume fossil fuels at an unsustainable rate. That means harm to our natural resources and harm to the environment in the form of global warming.
- The energy market is global. Unless we bar exports, energy companies will simply sell what's produced here to the highest bidder.
- Developing nuclear energy is dangerous. The greater the number of nuclear power plants in this country, the greater the chances of a major accident. Plus, we still don't have a serious long-term strategy for storing nuclear waste. Until that time comes, it's simply an unsustainable answer to our problems.

# Approach Three

## Move toward a more energy-efficient society.

*Reduce individual energy use and pursue policies that promote energy efficiency in our buildings, cars and appliances. Meanwhile, modernize our energy grid.*

Exploring alternative energy sources is certainly important, but not getting to the crux of the problem: we as a society need to use energy more efficiently and reduce our energy use overall. Americans should be more mindful of how and how much energy they use, and the government should invest in infrastructure that makes the country more energy efficient.

### This should be done by:

- Helping and encouraging Americans to change their energy lifestyle. Individuals should buy more energy-efficient appliances and vehicles, construct smaller houses, or renovate their existing homes to be more energy efficient. The government should offer tax breaks for energy efficient homes, appliances and vehicles, as well as improve and increase their energy standards and compliance laws.
- Improving building codes—buildings account for 40 percent of our nation's energy use and carbon dioxide emissions—and setting efficiency standards for manufacturers.
- Changing the way Americans commute by placing surcharges on vehicles that guzzle gas, investing in railroads and public transit and exploring technology for electric cars. Relying more on telecommuting and teleconferencing when it's not necessary to be in the office or at a meeting in person in order to cut down on the use of oil for cars and planes.
- Rebuilding the electricity grid to be more energy efficient. Our current one may not even be able to keep up with energy demand as it is, and it certainly isn't ready for a move to renewable energy or electric cars. It's time to replace outdated copper wires with new high-tech models that can carry three to five times as much current.

### Arguments for:

- We use way more energy in this country than we ought to—in 2011, the U.S. consumed 18.5 percent of the world's energy, even while we only hold 4.5 percent of the world's population.
- We should be leading the way globally and setting a precedent for reduced and more efficient energy use.
- Improving the grid and building green may cost considerable money up front, but these moves will save us even more in the long-run.

### Arguments against:

- All the conservation in the world isn't going to do the job, and improving energy efficiency will do almost nothing to reduce our reliance on foreign oil.
- We're not out of the woods yet from the Great Recession, during which lots of Americans lost their homes. Enforcing energy-efficient building codes will cost a lot of money, which will increase rents and housing prices.
- Changing the way we live is going to be difficult to implement and will take a very long time. After all, the Energy Department has had since 1973 to set mandatory energy standards, and it's missed 34 deadlines! It's wiser for the government to invest its time and money elsewhere.



## Resources to learn (and do!) more:

### Energy Department:

**The United States Department of Energy:** The Department's website is chock full of easily digestible charts and interactive features, not to mention all the data and policy information. <http://energy.gov>

### Understanding Energy:

**U.S. Energy Information Administration:** The website for this federal agency compiles statistics on every single kind of energy and publishes domestic and international short- and long-term energy outlooks. [www.eia.gov](http://www.eia.gov)

**EIA Kids:** Great source of approachable information for kids and adults on various topics, including energy sources and using and saving energy. [www.eia.gov/kids](http://www.eia.gov/kids)

**International Energy Agency:** This independent organization working to ensure reliable, affordable and clean energy for its 28 member countries, including the U.S., Japan and most of Europe, has key world energy statistics and an iPhone app. [www.iea.org](http://www.iea.org)

**Energy Realities:** This visual guide to our world's energy needs features great maps and graphics, especially about population change and energy consumption. [www.energyrealities.org/meeting-our-needs](http://www.energyrealities.org/meeting-our-needs)

**The Energy Learning Curve:** This 2009 Public Agenda study found that the American people reach common ground on at least 10 major energy proposals, but may not yet be

prepared for the tradeoffs and challenges needed to make these proposals a reality. [www.publicagenda.org/pages/energy-learning-curve](http://www.publicagenda.org/pages/energy-learning-curve)

**Facing the Challenges of Climate Change: A Guide for Citizen Thought and Action:** A Public Agenda Choicework discussion guide, similar in format to this one, examining the different approaches to climate change specifically, along with their pros and cons. [www.publicagenda.org/files/pdf/globalwarming\\_guide.pdf](http://www.publicagenda.org/files/pdf/globalwarming_guide.pdf)

**Who Turned Out the Lights?, Scott Bittle and Jean Johnson:** Published by HarperCollins, this book is a guide for citizens to understand and decipher our energy challenges. The appendix is also a great source for additional resources on all sides of the issue. [www.publicagenda.org/whoturnedoutthelights](http://www.publicagenda.org/whoturnedoutthelights)

**The Great Energy Challenge:** From *National Geographic*, this website is a one-stop source for informational articles, test-your-energy IQ quizzes, blog posts examining our choices, videos and interactive features about most of the important energy issues our country faces. [environment.nationalgeographic.com/environment/energy/great-energy-challenge/](http://environment.nationalgeographic.com/environment/energy/great-energy-challenge/)

### Tools to Act and Interact:

**Household Carbon Footprint Calculator:** From the Environmental Protection Agency, this calculator provides an estimate of your or your family's greenhouse gas emissions and also explores what impact actions to reduce your emissions would have. [www.epa.gov/climatechange/ghgemissions/ind-calculator.html](http://www.epa.gov/climatechange/ghgemissions/ind-calculator.html)

**Planet Forward:** A video-based "public square" featuring the best ideas on how we can reduce our country's carbon footprint. Have an idea? Submit your own video! <http://planetforward.org>

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### About the Citizens' Solutions Guides:

Public Agenda's Citizens' Solutions Guides are nonpartisan, unbiased resources to help you think through a difficult issue in alternative ways, weighing and evaluating values, priorities, pros, cons and tradeoffs. The Guides can also be used as discussion starters for community and group conversations and in classes. Note that the Citizens' Solutions Guides are meant to help people start thinking and talking about an issue in productive ways — they are not meant to rigidly restrict thinking or dialogue. The perspectives described are not the only ways of dealing with the problem, nor are the viewpoints mutually exclusive in every respect. You can mix and match from different perspectives, or add additional related ideas.

For more information on the sources for this material, please refer to the Citizens' Solutions Guides online at <http://www.publicagenda.org/pages/citizens-solutions-guides>

### About Public Agenda:

Public Agenda is a national, nonprofit, nonpartisan organization dedicated to strengthening democracy and improving people's lives. Through research and public engagement, we help leaders, citizens and stakeholders build common ground on solutions to tough public problems like education reform, the environment and healthcare. Public Agenda was founded in 1975 by the social scientist and public opinion expert Dan Yankelovich and former Secretary of State Cyrus Vance, and is based in New York City.

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