

# GLOBAL WARMING 101



## OUR WARMING WORLD: HERE AND NOW

Americans are feeling the impacts of global warming now—they're clear, costly, and widespread. To protect America's health, create jobs of the future, and reduce the threat of climate change, we need to retire coal-burning power plants, dramatically increase energy efficiency, and replace fossil fuels with renewable energy.

### CLIMATE SCIENCE: DOCUMENTED EVIDENCE

Climate scientists agree that heat-trapping air pollutants in the atmosphere, most notably carbon dioxide, are rising rapidly and causing large-scale disruptions in climate. Since the beginning of the industrial revolution, observed carbon dioxide levels in our atmosphere have increased by nearly 50 percent—surging higher than any other time during the last 800,000 years. Around the world, temperatures have risen as a result. According to thermometer records, the 18 warmest years on record have all occurred since 1998, and 2016 was the hottest year in recorded history.

### WHAT CAUSES GLOBAL WARMING? WE DO

The primary cause of global warming is human activity—most significantly the burning of coal, oil, and natural gas to generate electricity, fuel transportation, and operate our businesses and homes.

### GLOBAL WARMING IMPACTS IN MINNESOTA

Minnesota's climate is changing and it is already affecting our health, environment, and economy. Global warming and extreme weather—what we call **EXPENSIVE** weather—is impacting our state's waters, infrastructure, health, agriculture, forests, transportation, and air quality.

- Since 2004, Minnesota has had four “once-in-a-thousand-year” floods, and the largest storms—those with three inches or more of rainfall in a single day—have more than doubled in Minnesota in just over 50 years.
- Health impacts from climate change can range from asthma attacks among children to heart attacks to premature deaths among the elderly. Minnesota's allergy season has grown longer due to global warming—and allergies may become more severe.
- Scientists expect the combined stresses associated with climate change will harm the productivity of corn and soybeans and reduce productivity in dairy operations.
- Forests of the Boundary Waters Canoe Area will change as the iconic spruce, fir, aspen, and birch trees retreat northward.
- Fish habitat is already changing in many of our lakes and rivers as warmer water temperatures increase algae blooms and exacerbate the spread of invasive aquatic species.

# THE CASE FOR CLEAN ENERGY

## RENEWABLE ELECTRICITY: OFTEN CHEAPER THAN COAL AND NATURAL GAS

Renewable electricity isn't just cleaner, it's also more cost-effective. From 2009 to 2017, solar and wind energy prices fell 86 and 67 percent, respectively, and in the Great Plains, the average price for wind power is now around \$15 per megawatt hour. That compares favorably to the operating costs of many coal plants, which can be higher than \$30 per megawatt hour. These dramatic cost declines are creating a 'win-win-win' situation with higher earnings for utilities, lower electric rates for customers, and cleaner energy for all. Because of this, utilities will be able to retire dirty coal plants earlier than expected.

## CLEAN ENERGY CUTS RISKS TO GLOBAL SECURITY

The Pentagon views global warming as a major national security threat because of the many ways it can increase global geopolitical instability. Extreme weather, floods, and drought will aggravate problems such as poverty, social tensions, environmental degradation, and the ability of governments to meet the basic needs of their populations. To cut the risks to global security, we must deeply cut the emissions causing global warming.

*"We're investing big in wind because of the tremendous economic value it brings to our customers. With wind energy at historic low prices, we can secure savings that will benefit customers now and for decades to come."*

Ben Fowke  
CEO, Xcel Energy



## RENEWABLES AND ENERGY EFFICIENCY ARE JOB GROWTH ENGINES

Thanks largely to effective energy policies that increase renewable energy and energy efficiency in our energy mix, Minnesota has one of the strongest clean energy economies in the nation. We've already developed over 57,000 clean energy jobs. Since 2000, clean energy employment grew 78 percent, compared to the state's total job growth of 11 percent, and now provides over \$1 billion annually in payrolls, as well as millions of dollars in taxes to cities and counties across the state.

## FOSSIL FUELS DAMAGE OUR CLIMATE AND OUR HEALTH

Minnesota's most vulnerable residents—including elderly and children—are at increased risk from fossil fuel pollution and global warming. These risks include increased rates and severity of heart and lung disease, heat-related illnesses, allergies, and asthma. In Minnesota, burning fossil fuels for electricity costs Minnesotans over \$2.1 billion annually in health and climate damages.





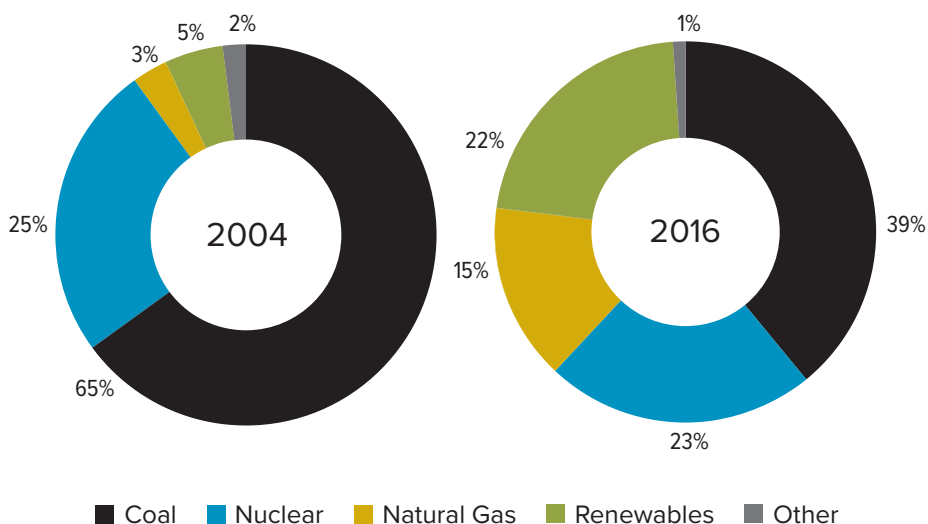


## CLIMATE SOLUTIONS AT THE SCALE OF THE PROBLEM

Minnesota is a national leader in clean energy with a track record of growing jobs and creating healthier communities, all while cutting carbon pollution. The work ahead is great, and together with you, we are well prepared to solve the climate challenge at the scale of the problem. Fresh Energy advocates for the next steps in fighting global warming, including these policies and practices:

- Retire our biggest sources of carbon pollution—older coal-burning power plants—and replace them with cheaper wind and solar energy and energy efficiency.
- Cut waste in energy use in all parts of our economy.
- Move full steam ahead on renewable energy: double down on Minnesota's successful Renewable Energy Standard, increasing it to 50 percent renewable electricity by 2030.
- As our power sector decarbonizes, electrify our transportation system, as well as home and water heating.

### SOURCES OF ELECTRICITY IN MINNESOTA



SCIENCE POLICY DIRECTOR

For over 25 years, Fresh Energy has focused on developing science-based, data-driven climate and energy policies that create opportunities for all people to thrive from clean energy solutions. We tell our members and friends: Identify your highest lever of influence on climate policy and we will help you pull that lever with all your strength. I prize the many passionate, smart Minnesotans whose work has made our state a leader in the clean energy economy.

Over this coming year, Fresh Energy will work alongside local partners to drive even more opportunities for deep carbon reduction at the pace required to address the climate urgency. Minnesota's early start on clean energy and continued policy support gives us a tremendous competitive advantage as we implement global warming solutions.

However the job's not done yet. We need to act so that we can tell kids growing up today: We did everything we could in 2018 to fight global warming, and it worked!

*J. Drake Hamilton*

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## WHAT YOU CAN DO

- Learn more about what Minnesota is doing by visiting [fresh-energy.org/MNclimateaction](http://fresh-energy.org/MNclimateaction).
- Contact your local, state, and federal officials and urge them to support policies that advance renewable and efficient energy.
- Sign up for wind or solar programs through your local utility.
- Use efficient appliances and lights and work to cut energy waste in everything you do.
- Choose cleaner transportation options.

### YOUR CLEAN ENERGY CHAMPION

Fresh Energy is an independent, Minnesota-based nonprofit organization working to speed the transition to a clean energy economy. Our team of scientists, attorneys, analysts, and economists shapes and drives policies that benefit our communities.

## INVITE US TO SPEAK

- Share the solutions: Invite Fresh Energy to speak at your company, community group, or congregation by contacting J. Drake Hamilton at [hamilton@fresh-energy.org](mailto:hamilton@fresh-energy.org).

***“J. Drake Hamilton has a gift for giving presentations using fascinating stories – it’s fun and inspiring to listen to her speak!”***

Program Participant / April 2017

### HOW TO GIVE

You can support Fresh Energy’s work to transition to clean energy in a number of ways:

- Use the enclosed envelope
- Donate online at [fresh-energy.org/join-donate](http://fresh-energy.org/join-donate)
- Call 651 726 7561