

THE PRICE TAG OF BEING YOUNG

Climate Change and
Millennials' Economic Future

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AUTHORS

NEXTGEN CLIMATE

NextGen Climate is a San Francisco-based environmental advocacy organization. Founded by businessperson and philanthropist Tom Steyer in 2013, we act politically to prevent climate disaster and promote prosperity for every American. Working at every level, we are committed to supporting candidates, elected officials, and policymakers across the country that will take bold action on climate change. NextGen Climate Action is a 501(c)(4) organization. NextGen Climate Action Committee is a political action committee.

DEMOS

Demos is a public policy organization working for an America where we all have an equal say in our democracy and an equal chance in our economy.

Our name means “the people.” It is the root word of democracy, and it reminds us that in America, the true source of our greatness is the diversity of our people. Our nation’s highest challenge is to create a democracy that truly empowers people of all backgrounds, so that we all have a say in setting the policies that shape opportunity and provide for our common future. To help America meet that challenge, Demos is working to reduce both political and economic inequality, deploying original research, advocacy, litigation, and strategic communications to create the America the people deserve.

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KEY FINDINGS

This report quantifies the cost of climate change to millennials and their children, compared to a world without climate change. The climate change costs are compared to other significant economic burdens millennials will face over the course of their lifetime, including student debt, child care, stagnant wages, and the lack of good jobs. The key findings of this analysis include:

- Without action on climate change, a 21-year-old in the class of 2015 earning a median income will lose \$126,000 in lifetime income, and \$187,000 in wealth*.
- Without action on climate change, a 21-year-old earning a median income will lose \$100,000 in lifetime income, and \$142,000 in wealth.
- For the children of millennials, the losses from climate change will be drastically greater.
 - » A child born in 2015 with median earnings will lose \$357,000 in lifetime income and \$581,000 in wealth.
 - » A child born in 2015 with median earnings and a college degree will lose \$467,000 in lifetime income, and \$764,000 in wealth.
- Without action on climate change, the millennial generation as a whole will lose nearly \$8.8 trillion in lifetime income.

- The economic losses caused by climate change are substantially greater than the damages of other economic challenges.
 - » Student debt costs the median-earning college-educated individual approximately \$113,000 in lost wealth over a lifetime, due to reduced savings for retirement and homeownership.
 - » Losses from the Great Recession cost the median-earning college-educated household \$112,000.

We must act quickly to address climate change because the impacts are occurring now faster and stronger than predicted:

- July 2016 was the 15th straight month of record-breaking heat.¹
- The 21st century has seen 15 of the 16 hottest years on record.²
- For the eighth consecutive year, extreme weather has cost U.S. taxpayers over \$10 billion.³
- Sea levels are rising and in Miami, Norfolk, and other coastal cities, tidal flooding is becoming the norm – even on days without storms.
- Drier and longer droughts are threatening our public health and crops.

*We calculate wealth as long-term savings if lost income due to climate change were to be invested in a conservative portfolio of stocks and bonds returning 3.5 percent annually.

We must transition to a 100 percent clean energy economy in order to avoid the devastating economic impacts of climate change detailed in this report. And we must capitalize on the significant economic driver clean energy can be for the U.S. economy. According to a recent study from ICF International⁴, if we transition to a clean energy economy by 2050, in that year we will:

- Create up to **2 MILLION NEW JOBS**
- Boost our economy by **\$290 BILLION**
- Increase household disposable income by **\$650**
- Save families **\$41 BILLION** on energy bills

INTRODUCTION

The millennial generation—the largest in U.S. history—faces serious economic challenges. Politicians have made a series of policy choices that are leaving the millennial generation in bad shape, and this is particularly true for what could be the biggest threat ever faced over the lifetime of a single generation: climate change.

Millennials are already facing many difficulties in an economy slowly recovering from the worst economic collapse since the Great Depression. Quality full time jobs are often out of reach for many young people, wages have stagnated, and millennials have less wealth and financial stability than previous generations. Getting a college degree is less and less affordable, and student debt has exploded. Without access to quality, affordable child care, young parents have to fend for themselves as they struggle with the financial burdens of caring for their children in the years prior to K-12 schooling. These are some of the

many reasons that the millennial generation is likely to be the first in our country's history to be worse off than the generations which preceded it.

But millennials face a challenge unlike anything previous generations have had to tackle. Unless our elected leaders take aggressive and immediate action, the millennial generation will have to live with the devastating economic, health, and environmental impacts of climate change.

Climate change will have a significant impact on millennials' household incomes and wealth, with rapidly worsening effects by mid-century, as the youngest millennials reach their peak earning years. In this report, we investigate these economic losses for millennials and future generations if we fail to act on climate change, compared to a scenario of no climate change. Our study finds that:

- A 21-year-old college graduate in the class of 2015 earning a median income will lose over \$126,000 in income over her lifetime, and \$187,000 in wealth if the income were to be saved and invested.
- A 21-year-old college graduate in the class of 2015 earning a median income will lose over \$100,000 in income over her lifetime, and \$142,000 in wealth if the income were to be saved and invested.
- For the children of millennials, the losses from climate change will be drastically greater.
 - » A median-earner born in 2015 will lose approximately \$357,000 in income over her lifetime, and approximately \$581,000 in wealth if the income were to be saved and invested.
 - » A median-earner born in 2015 who will graduate from college will lose approximately \$467,000 in income over her lifetime, and approximately \$764,000 in wealth if the income were to be saved and invested.
- The lifetime economic losses caused by climate change are substantially greater than the negative impacts of student debt.

- » Student debt costs the median-earning college-educated individual approximately \$113,000 in lost wealth over a lifetime, due to reduced savings for retirement and homeownership.
- » Because of the Great Recession, the median-earning college-educated household lost \$112,000 in wealth.

Young people today are uniquely exposed to the risks, costs, and devastation of climate change on its current path. Yet, the economic risks are compounded even further since inaction on climate change means that we are missing out on a major opportunity for much-needed new investment and millions of new jobs by transitioning to clean energy. Properly targeted, these investments could be especially important for young people in communities of color, who are disproportionately exposed to the toxic pollution and climate risks that inevitably arise in a fossil-fuel driven economy. Additionally, for communities whose economies have been dependent on the fossil fuel industry, proper investment in a just transition to a clean energy economy could lead to an important economic revitalization.

For the millennial generation, today's status quo on climate and inequality is not only unjust but it is also unsustainable. A powerful, principled, and deeply American way to change the status quo for young people, our country, and our planet is by demanding action at the ballot box. More than any previous generation, millennials have the power to chart a better course for themselves and for future generations—and that starts with voting for leaders who will make the right choices on the things that matter most, like climate change and inequality.

I. MILLENNIALS' HIGH COSTS IN THE NEW INEQUALITY ECONOMY

THE BIGGEST GENERATION GETS THE RAWEST DEAL

We examine the economic challenges and rising financial burdens facing young people: student debt, child care, jobs and stagnant wages, financial insecurity, and inaction on climate change. We find that, left unaddressed, climate change will bring *substantial additional costs and income losses* to the millennial generation and future generations, in essence, placing a societal *climate penalty* on their income and wealth.

In all of these issue areas—but especially for climate change—bad public policies (including policy inaction) are the main drivers of damages for millennials; taken together, they add up to a massive betrayal of young people by our political leaders, unfolding over the last several decades and punctuated by the financial crash and economic slowdown since 2008.

Millennials' are facing the stingiest economy in three generations, and the most unequal economy in more than a century. In many key areas for enabling upward mobility and raising living standards over a lifetime, our political system is letting millennials down. In the remainder of this section, we examine four core aspects of the larger inequality crisis that are disproportionately affecting millennials—even without taking into account the devastating consequences of a failure to address climate change.

First, there is college affordability. Getting a college education—a near-necessity for upward mobility today—is increasingly unaffordable, leaving most students with a heavy burden of debt from college loans. Second, for millennials raising children, child care costs are wreaking havoc on household budgets and limiting parents' ability to move up the ladder

in the workplace, especially for women. Third, the wages of middle- and low-income jobs have stagnated, even as more and more income flows to the richest Americans: since 1993, approximately 52 percent of income gains have gone to the top 1 percent of households and more than 91 percent went to the top 1 percent in the three years after the 2008 financial crash.⁵ Finally, millennials' wealth and financial security has deteriorated, with cascading effects that could leave their children even worse off.

While this report cannot provide a detailed examination of the policy drivers of the millennials' raw deal, some of the core policy failures should be noted here to contextualize this urgent turning point for issues of climate and inequality. The college affordability problem for one has many causes, but fundamentally is a problem created by politicians failing to keep up investment in higher education with the growing number of students attending college. This has led universities to rely more and more on tuition to cover the cost of a college education. As the cost of tuition rises, students rely more and more on loans to be able to afford an education.

In stark contrast with what we see almost universally in other wealthy democracies, our elected leaders have also failed to invest in the child care needs of working families, many of whom have no access to paid family leave or to affordable, high-quality child care for young children. There has been modest progress on this front: the Family and Medical Leave Act of 1993 required employers with 50 or more employees to allow three months unpaid leave for the care of a newborn or an ailing family member, and a few states have started to experiment with paid parental leave programs. However, overall, we've made almost no progress in this area, and families are paying the price.

For wages and employment, several core policy failures have been at work, including trade policies that drive jobs and investment overseas, financial deregulation and new business models pitting "shareholder value" against workers, communities, and the environment, aggressive attacks on unions and the steep decline of union membership, and the



Getting a college education—a near-necessity for upward mobility today—is increasingly unaffordable, leaving most students with a heavy burden of debt from college loans.

failure to raise the federal minimum wage. Finally, millennials' declining wealth has mainly been driven by rising household indebtedness as incomes have stagnated amid rising costs for college, health care, and other essential goods.

In the remainder of this section, we examine what millennials are up against as a result of these policy failures. Armed with such an analysis, millennials can recognize the urgency of this moment and the need to force change by voting in record numbers in 2016. No generation has more of a need to demand significant, meaningful change in the way things are working today.

HIGHER EDUCATION AND STUDENT DEBT

While college is still the surest pathway to economic security, millennials face a higher education system in which costs have skyrocketed and the need to borrow for college is ever-increasing. Overall student debt in the economy has increased from around \$260 billion in 2003 to nearly \$1.3 trillion today.⁶ While most students who graduated in the early 1990s did not take on debt for their degree, seven in ten students borrow today. Undergraduate student debt, moreover, is not taken on equitably—81 percent of black students and 84 percent of lower-income students borrow more often and in higher amounts than white students (63 percent), even at public colleges and universities (Figure 01).⁷

Even as the economy has slowly recovered from the Great Recession, student borrowers are falling behind on their payments and the percentage of student loans in default has continued to rise.⁸ Even more troublingly, around one-third of student borrowers drop out of college—including four in ten

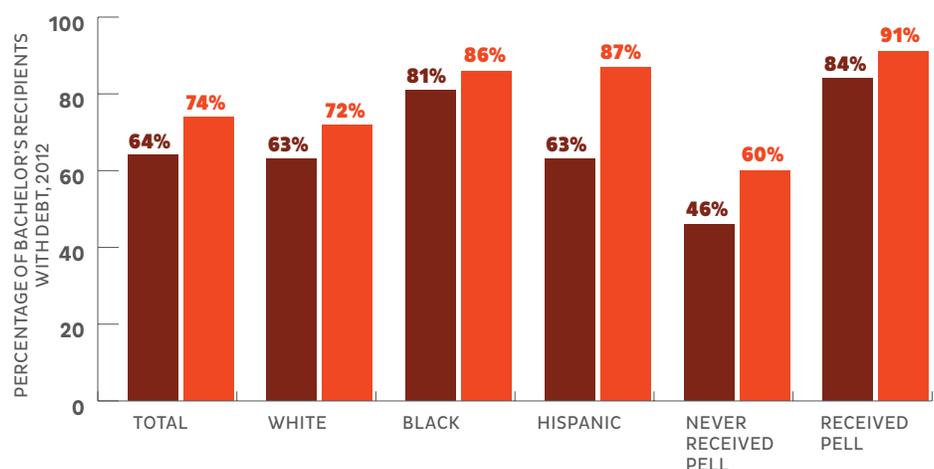
black student borrowers. The problem is particularly pronounced at for-profit institutions, where two-thirds of black and Latino student borrowers drop out of four-year degree programs.⁹ Even for those who are able to meet their monthly payments, the rise in student debt means that millennials are still entering the workforce with a financial burden that other generations simply did not endure.

Young households with no student loan debt are more likely to own homes and have retirement and liquid assets that are considerably larger than those households weighed down by debt. Households with a college degree and no debt have nearly \$100,000 in average retirement savings, while college-educated households with debt have less than half that amount.¹⁰ As noted in the introduction, Demos has found that even average levels of student loan debt may result in lifetime wealth losses of over \$100,000 for college-educated individuals earning a median income.¹¹

FIGURE 01

BLACK AND LOW-INCOME STUDENTS ARE MORE LIKELY TO BORROW FOR A BACHELOR'S DEGREE

■ PUBLIC UNIVERSITY
■ PRIVATE NON-PROFIT UNIVERSITY



PAID PARENTAL LEAVE AND CHILD CARE NEEDS

Today nearly four out of ten young adults age 25-34 are raising children, and millennials are the parents of most new babies born in the United States.¹² Yet millennial parents face formidable challenges when it comes to caring for their children. This begins immediately at birth, when most parents lack paid time off to care for a new baby, which only continues with the exorbitant cost of childcare, the lack of public preschool, and the high price that parents pay for taking time out of the workforce to care for children. Although 73 percent of women age 25-34 are in the labor force and 40 percent of households with children are supported by mothers as the primary source of income for the family, our economy is largely structured as if all families still had a stay-at-home parent raising children.¹³

Unlike nearly every other wealthy democracy, the United States offers no guarantee of paid time off for parents to care for a new baby.¹⁴ While some employers voluntarily provide paid time to new mothers and fathers, these benefits are disproportionately offered to highly-paid professionals, leaving out the majority of working people. In 2015, only 12 percent of full-time workers age 25-34 had access to paid family leave through their employers.¹⁵ For young workers employed part-time, just 5 percent have access to paid family leave. Furthermore, black and Latino/a parents are less likely than white parents to have access to paid time off for a new baby.

As a result, one in four mothers report returning to work within two weeks of giving birth, despite the

potential negative health consequences for mothers and infants alike.¹⁶ And some new mothers – including 26 percent of working black women having their first child, 24 percent of Latinas and 21 percent of white women – report quitting their jobs entirely in order to take care of a new baby.¹⁷ Among the same group, 6 percent of black women, 8 percent of Latinas and 4 percent of white women say their employers fired them after their baby was born.¹⁸

In order to remain in the workforce, parents must often pay the exorbitant cost of child care. According to the research and advocacy group Childcare Aware, the average cost of full-time care for a single infant in center-based care ranges from \$4,822 a year in Mississippi to \$17,062 in Massachusetts.¹⁹ Similarly, costs to place a 4-year-old in a childcare provider's home range from \$3,675 in Mississippi to \$10,000 in Massachusetts. The expenses add up quickly: Childcare Aware estimates that married couples earning the median family income in their state would have to spend between 6.8 percent and 15 percent of their income on center-based care for their infant during a full workweek. For single parents the costs can be even more overwhelming, with an average annual cost of over 40 percent of the state median income for single mothers in every state. While some low- and moderate-income families receive public subsidies to help defray the cost of child care, eligibility for this assistance varies widely by state, and some states have long waiting lists that prevent eligible families from accessing child care.

THE STRUGGLE TO FIND GOOD JOBS

UNEMPLOYMENT AND UNDEREMPLOYMENT

The Great Recession could not have come at a worse time for millennials.²⁰ Just as many were entering the job market for the first time, the economy bottomed out, significantly shrinking the supply of jobs and shifting many jobs to part-time hours.

The job market has slowly improved, but many young people (ages 25-34) still face persistent unemployment. This is especially true for young workers of color. Around one in seven young black workers were unemployed for 5 weeks or more in 2014, despite several years of economic recovery (See Table 1; note that this is worse than the same statistic among young white workers at the height of the Great Recession). Indeed, the Great Recession hit men, black workers, and those without college experience the hardest. A full quarter of millennials without a high school diploma were unemployed for more than a month at the height of the recession, and about one in six remain so today (Table 2).

Even for millennials who could find work, many have been forced into part-time work and often low-wage work. The number of part-time workers who were seeking a stable, full-time job skyrocketed during the recession and remains well above the level experienced by previous generations. In 2014, seven years into the recovery, more than 36 percent of young part-time workers were only working part-time because they either could not find a full-time job or they experienced a forced reduction in work hours (Figure 2).

STAGNANT WAGES

The jobs millennials do find often pay less than the jobs previous generations of young people enjoyed. For the past several decades, wages and incomes for most families have remained stubbornly stagnant or even decreased. The average young white worker (age 25-34) earns about the same as his counterpart from a generation or two ago, while the average millennial black or Latino worker earns slightly less than their counterparts in previous generations. Women have seen a boost in average earnings, while the average young male worker earns over \$7,000 less annually than he would have in 1980 (Table 3).

While a college degree has provided a buffer for many workers, those without a college degree have seen incomes drop dramatically. Today, although the average young worker with a bachelor's degree makes slightly more than his or her counterpart did a generation or two ago, the average young worker without a bachelor's degree earns significantly less. Workers with some college or a high school diploma have seen their average incomes drop by nearly \$6,000, and the average worker with less than a high school diploma now earns sub-poverty level wages (Table 4).

TABLE 01**YOUNG BLACK WORKERS FACE A PERSISTENT UNEMPLOYMENT CRISIS**

YEAR	SHARE OF YOUNG WORKERS UNEMPLOYED 5 WEEKS OR MORE			
	White	Black	Hispanic/Latino	Asian American
1980	12.5%	24.4%	17.0%	N/A
1984	11.8%	21.3%	17.3%	N/A
1989	8.7%	19.1%	12.9%	9.2%
1994	9.2%	16.0%	12.2%	8.9%
1999	5.6%	9.8%	8.0%	6.1%
2004	6.9%	13.5%	8.3%	6.4%
2009	12.1%	18.5%	16.1%	11.1%
2014	6.7%	14.3%	9.4%	7.7%

Source: Demos calculations from the Current Population Survey. "Young" workers defined as ages 25-34.

TABLE 02**YOUNG WORKERS WITHOUT COLLEGE DEGREES FACE BLEAK EMPLOYMENT PROSPECTS**

YEAR	PERCENT OF WORKERS UNEMPLOYED FOR FIVE WEEKS OR MORE			
	Less than High School Diploma	High School Diploma	Some College	Bachelor's Degree or Higher
1980	24.4%	15.4%	12.2%	7.3%
1984	24.1%	15.4%	10.1%	6.7%
1989	18.7%	11.6%	8.2%	4.5%
1994	18.1%	12.1%	8.6%	6.3%
1999	12.9%	7.2%	5.8%	3.6%
2004	11.3%	9.5%	8.0%	4.9%
2009	24.7%	17.7%	12.3%	7.9%
2014	15.5%	10.2%	9.4%	4.5%

Source: Demos calculations from the Current Population Survey. "Young" workers defined as ages 25-34.

TABLE 03**MEDIAN INCOME BY SEX AND RACE/ETHNICITY, WORKERS AGED 25-34**

YEAR	SEX		RACE/ETHNICITY				
	Men	Women	White	Black	Hispanic	Asian/Pacific Islander	Other*
1980	\$44,763	\$25,891	\$36,607	\$28,768	\$28,256	N/A	\$31,818
1985	\$41,895	\$26,454	\$36,646	\$26,785	\$26,443	N/A	\$32,199
1990	\$39,727	\$27,324	\$36,284	\$26,327	\$25,015	\$35,953	\$28,857
1995	\$37,561	\$27,392	\$35,617	\$26,440	\$23,602	\$34,602	\$23,330
2000	\$41,296	\$31,687	\$41,295	\$31,384	\$27,530	\$42,396	\$28,218
2005	\$37,867	\$30,359	\$38,361	\$29,128	\$26,701	\$42,479	\$33,497
2010	\$36,960	\$31,609	\$38,043	\$27,774	\$25,000	\$40,217	\$30,435
2014	\$37,044	\$30,036	\$37,945	\$26,035	\$26,031	\$40,047	\$26,031

Source: Demos calculations from the Current Population Survey. Income levels are for all workers and are in 2015 dollars. *"Other" includes Asian Americans from 1980-1986. American Indians are included in "other" because of sample size constraints.

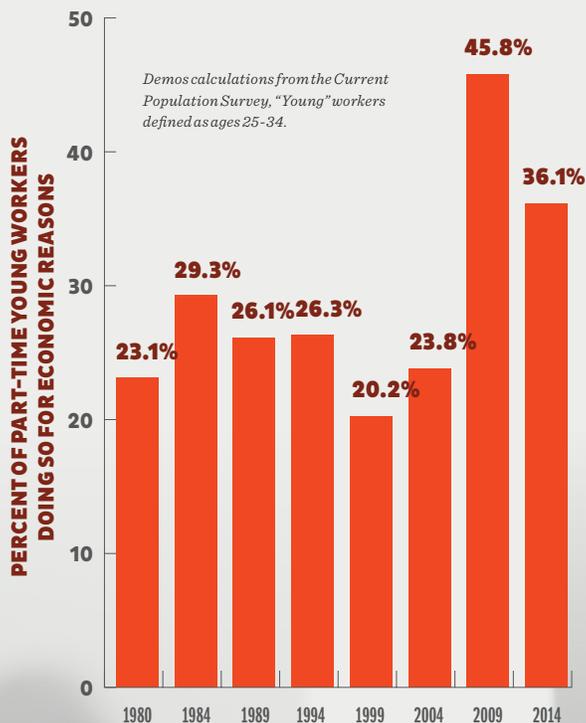
TABLE 04**MEDIAN INCOME BY EDUCATION LEVEL, WORKERS AGED 25-34**

YEAR	EDUCATION LEVEL			
	Less than HS Diploma	HS Diploma	Some college	Bachelor's Degree or higher
1980	\$23,420	\$32,220	\$36,156	\$45,108
1985	\$21,470	\$30,850	\$35,535	\$47,699
1990	\$19,773	\$29,205	\$36,280	\$47,527
1995	\$19,360	\$27,996	\$32,350	\$46,698
2000	\$20,923	\$30,779	\$35,892	\$52,307
2005	\$21,846	\$29,131	\$35,136	\$48,608
2010	\$18,478	\$27,174	\$32,609	\$48,113
2014	\$20,024	\$26,241	\$30,036	\$49,063

Source: Demos calculations from the Current Population Survey. Income levels are for all workers and are in 2015 dollars.

FIGURE 02

GREAT RECESSION LEFT MANY PART-TIME WORKERS UNABLE TO FIND A FULL-TIME JOB



WEALTH AND FINANCIAL SECURITY

The financial security of young households—those headed by a person between 25-40 year olds—has eroded in the past generation, particularly for young adults with lower education levels.²¹ The median wealth of young households declined from \$34,561 in 1989 to \$20,135 as of 2013, a 42 percent decline. At the same time, large racial wealth gaps have persisted through the overall decline. The wealth decline was concentrated among young white households, who had much more wealth to lose and saw their median wealth decline by a third to \$34,163. Starting at much lower levels of wealth due to enslavement, land theft, segregation, and continuing exclusion from America's wealth-building policies, the median wealth of young black households increased slightly since 1989, to \$3,625. Latino households' median wealth also increased slightly, to \$10,195. Young households of all education levels have seen their wealth fall, but the decline was most pronounced for college-educated households, who had more to lose: the median wealth of young households with a bachelor's degree or higher declined by 24 percent over the past quarter century and households with some college or an associate's degree saw their wealth fall by more than 60 percent.

The major reason for the decline in the wealth of young households was the large increase in the amount of debt they carried, mainly student debt. Overall, young households' median debt increased nearly 75 percent, from \$38,682 in 1989 to \$67,115 in 2013. The increase was highest among college-educated households, who saw their debt rise by 47 percent over the past quarter-century. The rise in debt also explains the increase in the share of young households who have negative wealth, meaning they have more debt than assets. The share of young households with college degrees with

negative wealth more than doubled in the past 25 years, rising from 9.7 percent in 1989 to 20.1 percent in 2013.

On average, young people who dropped out of high school actually reduced their household debt by 64 percent over the last 25 years. But this was largely due to a precipitous decline in homeownership: just 27 percent of young people without a high school diploma owned their homes in 2013, a little more than half as many as the 47 percent who owned their homes in 1989.

Unfortunately, the decline in young households' wealth is actually much greater than the debt statistics show, if we also account for changes in the retirement system. In particular, the radical shift from defined benefit retirement plans to defined contribution plans, such as 401(k)s, has taken a serious toll on retirement security, especially for younger workers. If a worker had a typical defined benefit plan that guaranteed \$20,000 per year in retirement, it would take more than \$250,000 in 401(k) savings to provide that same level of retirement income. Given the current 401(k) savings of young households, most will not reach retirement with savings remotely in the ballpark of what a typical defined benefit pension would have provided. Only 48 percent of young households have begun saving for retirement, and the median 401(k) balance among those with savings is just \$18,750. Young households of color are even worse off: only 40 percent of young black households and 24 percent of young Latino households have any retirement savings, and the median balances among savers are just \$9,425 and \$8,200 respectively.

There are some bright spots for young households. Homeownership among those with high school diplomas and college degrees has remained stable over the past quarter century, at 46 percent and 62 percent, respectively. Homeownership rates have also been stable among young black and Latino households, at

30 and 33 percent respectively (however, this is still much lower than the white homeownership rate of 58 percent). The credit card debt of young households has also declined across all races and education levels. Although the shares of young black and Latino households with credit card debt have remained steady at 34 percent and 37 percent respectively, the median credit card debt among indebted households has declined, falling by \$2,000 for young black households and \$2,200 for young Latino households. The share of young white households with credit card debt has fallen significantly, from 59 percent in 1989 to 43 percent in 2013.



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Although there are some positive statistics, the overall financial picture for young households is bleak, particularly given the growth in our national economy over the past 25 years. In a quarter century where real economic output has grown by 87 percent, we would expect young households to have shared in the new wealth that has been generated. Instead, their wealth has fallen, their debt has grown, and their retirement finances have become very insecure.

II. MILLENNIALS' CLIMATE COSTS: THE HIDDEN PENALTY OF INACTION ON CLIMATE CHANGE

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The Price Tag of Being Young: Climate Change and Millennials' Economic Future

In the broader public narrative, the economic challenges described above are often discussed as part of a larger systemic crisis in our economy—the crisis of inequality. The impacts of climate change, however, are rarely factored into this narrative. But our findings show that climate change is an integral and major part of systemic inequality. We already know that its damages are—and will continue to be—felt unequally. Communities of color and low-income communities will be hit the hardest, as these communities have fewer resources to deal with the impacts of climate change—for example, in protecting themselves from extreme weather events. Further, these same communities have always had the highest exposure to coal-burning power plants and other sources of fossil

fuel pollution, with sharply negative health impacts including high rates of asthma and other health conditions. If the transition to a clean energy economy is delayed, or if it is implemented unequally in keeping with historical patterns of racial exclusion, the fossil fuel economy will only deepen its toll on the health and well-being of America's poorest and most vulnerable communities.

However, there is another form of inequality at the heart of climate change—generational inequality, in the form of younger and future generations bearing a disproportionate share of the devastating economic costs of the climate crisis. The fact is, unchecked climate change will impose heavy costs on millennials

and subsequent generations, both directly in the form of reduced incomes and wealth, and indirectly through likely higher tax bills as extreme weather, rising sea levels, drought, heat-related health problems, and many other climate change-related problems take their toll on our society. The climate penalty alone is likely to significantly reduce the living standards of the largest generation in our history and will have an even more severe impact on the children of millennials. This burden alone would be crippling, but combined with the costs of student debt, unmet

childcare needs, stagnant wages, involuntary underemployment, and, for young people of color in particular, high rates of joblessness, the climate penalty could be a knockout blow for millennials. Thus, while millennials are the greatest hope for a more progressive, inclusive, and democratically empowered society, their future is all too precarious thanks to a profound failure of leadership on the serious economic challenges, and the huge climate risks, they uniquely face.

IMPACTS OF CLIMATE CHANGE AND ECONOMIC COSTS

Virtually all scientists agree that climate change is a human-made crisis driven by skyrocketing emissions of “heat-trapping” greenhouse gases (GHG) into the atmosphere, which are causing the planet to warm at an alarming rate. These gases, most notably carbon dioxide and methane, are emitted by the production and consumption of fossil fuels for power generation, by fossil fuel-intensive industrial and commercial development, by gasoline-powered transportation amid vast residential sprawl, as well as by deforestation, certain kinds of agriculture, and other destructive land-use practices. These practices either generate GHG emissions or deplete natural sinks that absorb carbon dioxide and other greenhouse gases, or do both.

The driver of climate change impacts is rising global temperatures and changing weather patterns, where even small shifts can have massive impacts on a large scale. The impacts of climate change are occurring now, faster and stronger than predicted. July 2016 was the 15th straight month of record-breaking heat.

Sea levels are rising and in Miami, Norfolk, and other coastal cities, tidal flooding is becoming the norm – even on days without storms. Over 10 million acres of American forest burned in 2015, the worst wildfire season on record. We know that drier and longer droughts are threatening our crops and pelting rains are leading to more frequent inland flooding. We know that Arctic ice covers less of our northern ocean than ever before, in both summer and winter, and that the ice caps of Antarctica and Greenland are shrinking rapidly. All of these changes are happening as average global temperatures have risen more than one degree Celsius compared to preindustrial levels.

If significant climate change impacts are already evident today then it should be patently clear that urgent action is needed to reduce GHG emissions dramatically in a very short time to limit further warming. The Paris Agreement of 2015 commits the United States and more than 180 other countries to reductions that will keep global warming below 2 degrees Celsius compared to preindustrial levels,

which is estimated to require at least an 80 percent reduction in emissions by 2050.

Many commonly used economic models of climate change damages in the United States emphasize several major areas of impact, varying regionally:

- Rising sea levels that will eventually inundate coastal communities.
- Rising frequency and intensity of extreme weather events and related flooding.
- Extreme water stress due to combined effects of over-consumption and climate-related water supply shrinkage, with likely mega-droughts in the Southwest, California, and the Central Great Plains states.
- Climate-related health impacts from various sources, including heat waves, poorer air quality, and increased rates of insect-borne infectious disease.
- Declining agricultural productivity due to weather events, soil changes, pestilence, and other climate-related factors.
- Wildfires of increasing frequency and intensity.
- Depletion of corals, shellfish, pteropods (a cornerstone of marine food chains), and other marine life.

For the eighth consecutive year, extreme weather has cost U.S. taxpayers over \$10 billion.²² In Pennsylvania and Ohio, pollution from coal- and gas-burning power plants is estimated to have caused 4,400 deaths and \$38 billion in health costs in 2015 alone.²³ An estimate of Florida's mounting coastal liabilities found that damages in the state from a single hurricane could reach \$641 billion by 2030 due to rising sea levels and more extreme weather.²⁴

But what does this mean for individual households, and particularly for millennials who will bear the brunt of rapidly rising climate change costs by the middle of this century? We can estimate the climate costs facing millennials with the help of a model developed by researchers from Stanford University and University of California at Berkeley, with which they measure the effects of rising temperatures on long-run economic growth.²⁵ Drawing on 50 years of historical data from 166 countries, and using rigorous controls, they investigate how rising temperatures will affect national productivity. In a “no climate action” scenario, they find that, by 2100, global per capita GDP will shrink by 23 percent relative to per capita GDP in a world without climate change. The U.S. GDP, without climate action, is projected to take a hit of 5 percent by 2050, and, by 2100, 36 percent of U.S. GDP per capita will be lost due to climate change. In other words, compared to a world without climate change, millennials' lifetime incomes will be reduced in line with recessionary GDP impacts by mid-century if we do not act on climate change; by the end of the century, when the children of the youngest millennials are retiring, the losses from climate change will be much greater, comparable to Great Depression-era losses.

Extrapolating from the long-run U.S. growth curve under a scenario of no action on climate change, we calculate how climate change's economic impacts will affect the incomes and wealth of millennials [See Appendix A for an explanation of our methodology for these estimates]. A 21-year-old earning a median income over her working lifetime will lose nearly \$100,000 in income, or approximately 5.5 percent of lifetime income, due to climate change. This translates into a \$142,000 loss in wealth by age 65, if the income were to be saved. A college graduate earning the median income for college graduates will lose \$126,000 in income, or, similarly, about 5.5

FIGURE 03

**LIFETIME LOST WEALTH FROM CLIMATE CHANGE,
WORKERS WHO ARE 21 YEARS OLD AS OF 2015**

- MEDIAN EARNER
- MEDIAN COLLEGE DEGREE EARNER

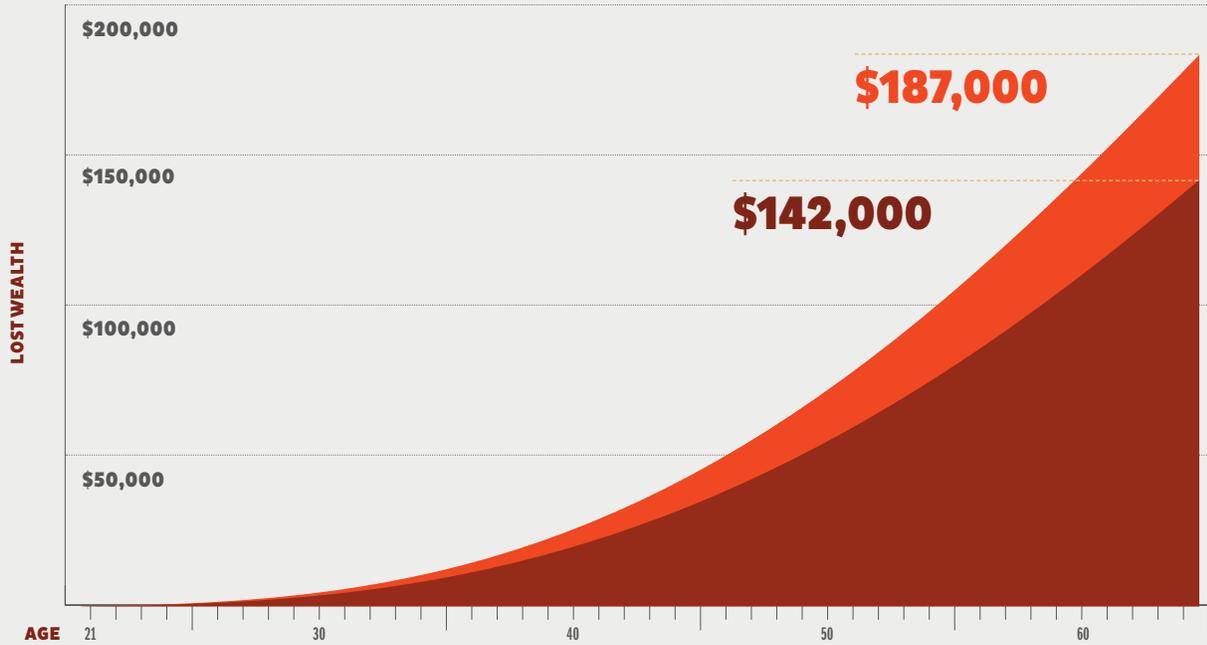
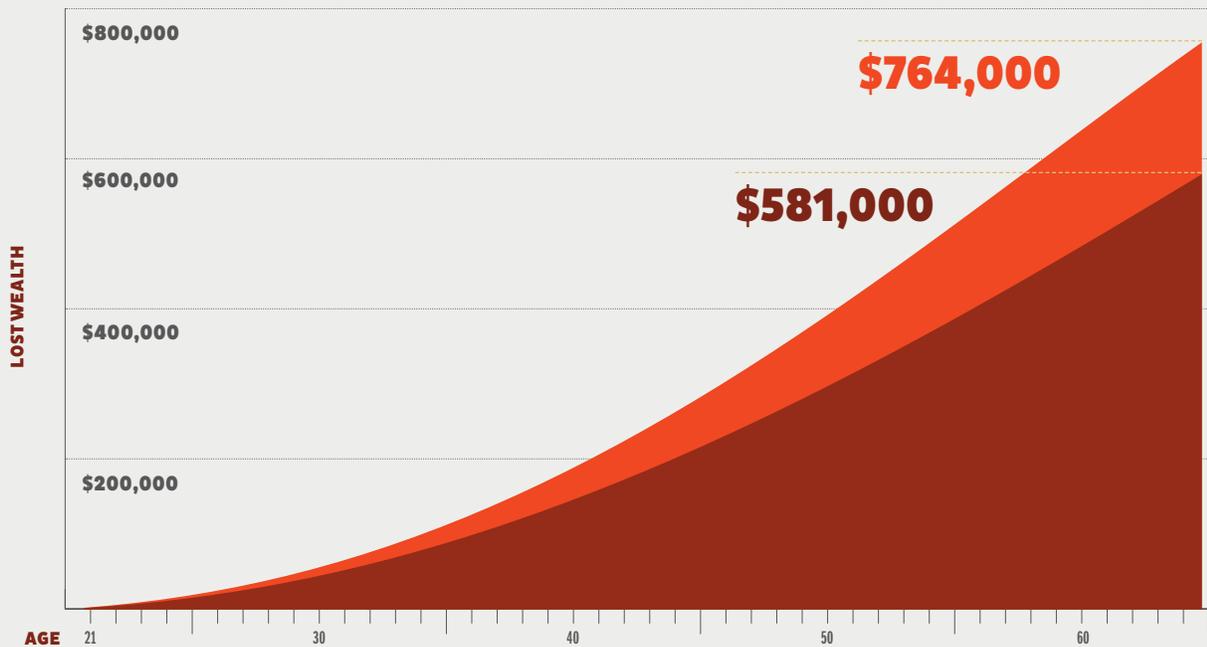


FIGURE 04

**LIFETIME LOST WEALTH FROM CLIMATE CHANGE,
WORKERS WHO ARE BORN IN 2015**

- MEDIAN EARNER
- MEDIAN COLLEGE DEGREE EARNER



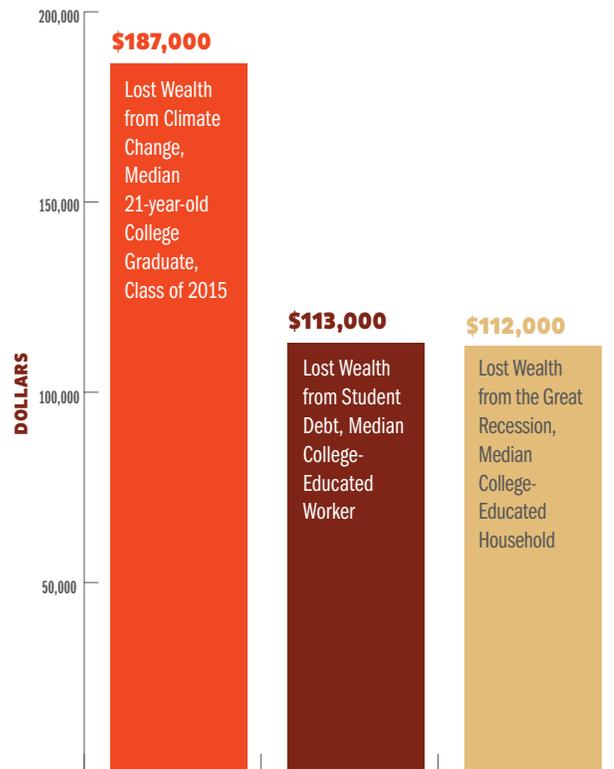
percent of her lifetime income. If the income were saved, she would lose approximately \$187,000 in lifetime wealth (Figure 3).

As climate damages accelerate after 2050, the children of millennials will be hurt drastically more than their parents. For example, a median earner born in 2015 will lose \$357,000, or 11 percent of her lifetime income, and \$581,000 in lifetime wealth due to climate change, if the income were saved. The median-earning future college graduate born in 2015 would lose approximately \$467,000 in lifetime income and \$764,000 in lifetime wealth (Figure 4). In the aggregate, the millennial generation will lose approximately \$8.8 trillion in lifetime income if we fail to act on climate change. If we assume that only 15 percent of that lost income will be saved (because many lower-earning millennials will not be able to save very much or at all), millennials will lose at least \$2 trillion in aggregate wealth if climate change continues unabated.

Compared to the other economic challenges they are facing, climate change's financial cost to millennials is much greater, for example as compared with the losses due to student debt or caused by other major crises, such as the financial crash of 2008 (Figure 5). According to Demos calculations, for a median-earning college graduate with median student debt, the lifetime wealth loss due to student debt is approximately \$113,000,²⁶ which is 40 percent less than the \$187,000 lifetime wealth loss of a college-educated, median-earning 21-year-old if we fail to act on climate change. Similarly, climate change losses are much greater than the losses caused by the financial crisis of 2008, the second worst financial crisis in modern history. The median college-educated household lost about \$112,000 in wealth during the Great Recession, much less than the \$187,000 loss projected for the median-earning 21-year-old

FIGURE 05

LIFETIME LOST WEALTH FROM MAJOR CRISES FOR COLLEGE-EDUCATED INDIVIDUALS



college graduate if we do not tackle climate change. In fact, much of the household wealth lost during the Great Recession has been recovered, which further underscores the much greater magnitude of income and wealth losses we can expect without fast and aggressive action on climate change.

Any way you cut it, if we don't take action on climate change, millennials and their children will bear the brunt of the accelerating climate costs, with income and wealth losses that will only further compound the economic challenges they are facing apart from climate change. But aggressive action on climate change will not only reduce the losses, it could also drive net gains in the economy as the substantial investment needed to reduce emissions translates into jobs and economic growth in our communities.

III. FROM COSTS TO OPPORTUNITY

REDUCING GHG EMISSIONS = INVESTMENT

= JOBS FOR THE FUTURE

Many studies and real time examples, like California’s carbon market or the Regional Greenhouse Gas Initiative, show that the low-carbon transitions can and will be a net job creator and will lead to economic growth. When we combine the positive economic case for climate change action with the averted financial losses for individuals and society, and especially for millennials and their children (as we saw in the previous section), the “net positive” case for transitioning to a clean energy economy is overwhelming.

The transition to a clean energy economy has multiple pathways, including:

- Investments in energy efficient housing and retrofits, and more efficient household durable goods (appliances, tools, etc.), complemented by energy-use reduction strategies in the commercial and industrial sectors.
- Decarbonizing electrical power generation with a shift to renewable power sources such as solar and wind.
- Decarbonizing transportation with electricity-powered vehicles, expanded electrified commuter rail, electrified ports, and expanded rail shipping, including regional rail electrification.

The pathways for renewable energy and zero-carbon transportation, in particular, require substantial new investments in infrastructures—solar and wind installations and transmission networks, roadside electric vehicle charging stations, and the various public transit and rail shipping infrastructures. Much of this investment is highly labor-intensive and, further, much of it will flow to high-paying sectors such as construction and manufacturing.

BENEFITS OF A CLEAN ENERGY ECONOMY

A leading study by ICF International²⁷ projects economic impacts of achieving an 80 percent reduction in GHG emissions (relative to 1990 levels) by 2050.²⁸ Looking at the years 2030 and 2050, the study estimates new investment needed, job creation, sectoral employment growth, and GDP growth, among other factors, and also breaks these trends down for nine regions across the country.

The topline results show that substantial decarbonization will have significant net positive benefits for our economy, without even accounting for averted GDP and fiscal losses that will follow from aggressive action to mitigate climate change. In 2050, climate change action could add as much \$800 billion in new investment (equal to roughly 2.6 percent of GDP that year), nearly 2 million net new jobs, and approximately \$290 billion to GDP. Seven of nine regions across the country will see net jobs gains from clean energy transitions, with the most significant gains in several of our most populous regions. The South Atlantic region (including VA, NC, SC, GA, and FL) will gain 672,000 jobs, the Middle Atlantic region (NY, PA, NJ) will gain 369,000 jobs, and the East North Central region (OH, IN, MI, WI, IL) will gain 384,000 jobs. To put this in perspective,

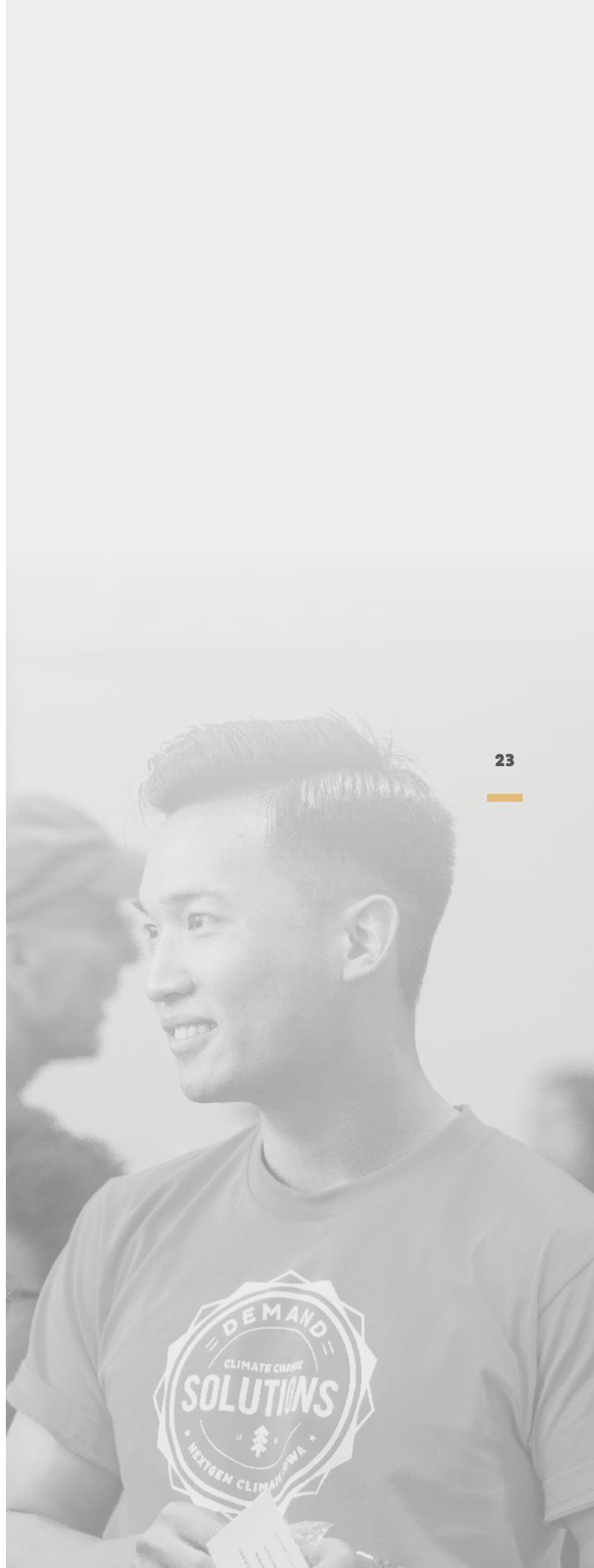
the projected clean energy employment gains in the South Atlantic alone are equal to about two-thirds of the entire workforce in fossil fuel extraction in 2015, and the combined new jobs in the South Atlantic and the Middle Atlantic regions total more than our entire automobile manufacturing workforce as of 2015.²⁹ Two regions, West South Central (TX, OK, AR, LA) and East South Central (KY, TN, MS, AL), could see fewer jobs due, in large part, to their economic reliance on fossil fuel industries. However, potential job impacts could be offset if clean energy investments are well-targeted in communities with the most serious economic needs in these areas.

The projected clean energy employment gains in the South Atlantic alone are equal to about two-thirds of the entire workforce in fossil fuel extraction in 2015.

TARGETING OF INVESTMENT CAN ENLARGE IMPACTS

The ICF numbers do not take into account how state-level targeting of investment can enlarge (or reduce) the actual economic impact of climate investments, and such considerations are important for ensuring that the communities most impacted by climate change benefit the most from the clean energy transition. Indeed, climate action can and should be an avenue for creating a more inclusive, racially-equitable economy that leaves no one behind. For example, energy efficiency investments will bring particularly large benefits in low-wealth communities of color, which often have the least efficient housing stocks and durable goods, and this is true from both a household perspective and a climate perspective. That is, efficiency gains are proportionally bigger if the largest investments are made in less energy efficient communities, and, likewise, lower energy bills mean significantly more to lower-income people, whose energy costs take a sizeable bite out of family budgets and often force families to sacrifice other essential needs.³⁰

Similarly, a targeted investment which adds 15,000 jobs in a high-unemployment community will have a greater impact than adding 15,000 jobs in a community with low unemployment. Thus, we should be mindful of how the aggregate net positive case can be further improved if investments are targeted for communities that need the most help economically. Similarly, clean energy investments in communities with more fossil fuel pollution will have proportionally greater health benefits and generate more health savings per dollar invested.



IV. WINNING ON CLIMATE: YOUNG VOTERS

Young people today have inherited two major challenges unlike any faced by the two previous generations since World War II. Climate change is already damaging our world and our country in significant ways, and we only have a small window left for bold action to avert the most serious impacts and risks—which will accelerate during millennials' peak earning years and dramatically so for the children of millennials. Millennials are also confronted with difficult economic challenges and the everyday spectre of intensifying inequality and racial divides—serious crises that challenge their progressive beliefs and views. Each of these crises on its own threatens to end the progress all American generations have enjoyed compared to their predecessors, but taken together, which is the current reality for millennials, the impact will be devastating.

We must transition to a 100 percent clean energy economy in order to avoid the devastating economic impacts of climate change detailed in this report. And we must capitalize on the significant economic driver clean energy can be for the U.S. economy. If we make

this transition, in 2050 we will create up to 2 million new jobs, boost our economy by \$290 billion, increase household disposable income by \$650, and save families \$41 billion on energy bills.

Due to their huge numbers, their diversity, and their progressive values, millennials' voting power is the key to winning these two fights, and we won't win either if we don't fight them together. If we don't take serious action on climate change, the profound economic costs will drain the resources we need to reinvest in our communities and level the playing field for young people, especially young people of color. Put simply, climate needs to be part of the agenda on inequality, and inequality needs to be part of the climate agenda. Indeed, the opportunity to marry climate and equity goals is already materializing in the form of new investments in achieving a low-carbon economy and creating clean energy jobs. We can tackle inequality and climate change alike if we act before it's too late. It all comes down to democracy. Young people have the numbers, the values, and the ideas to get our country on the right track for solving climate change

and inequality, and solving them together for people, planet, and prosperity. But they must show up on Election Day, in 2016 and beyond. The voices of millennials have too often been missing in the political process that has brought us to this time of reckoning. Now we need to fill the halls of our democracy with young people's voices, our best hope for winning on climate and equity alike.

Millennials now equal Baby Boomers as a share of eligible voters, which should give them the power to demand real solutions for the problems millennials uniquely face. But their numbers can't drive change if they do not vote. Historically, young people have not turned out to vote at the same rate as their parents. According to Census Bureau data, only 43 percent of eligible young people (18-24) voted in 2012, compared with 73 percent of eligible people who were 65 or older. In the typically lower-turnout midterm election of 2014, the age gap in turnout was even larger, 18 percent compared to 63 percent.³¹

Young people overwhelmingly support government action on climate change. Importantly, young people of color—who are growing rapidly as a share of the electorate—are the most supportive constituency for government action on climate change and regulation of carbon, with the strongest support coming from young Latinos. According to Demos analysis of data from the 2012 and 2014 Cooperative Congressional Election Surveys, more than 80 percent of people of color between the ages of 18 and 29 support EPA regulation of CO₂, and 80 percent of whites between 18 and 29 support CO₂ regulation. In comparison, only about 60 percent of middle-aged and older whites (50+) support CO₂ regulation. Seventy-two percent of young people of color and 61 percent of young whites support action on climate change, compared to about 66 percent of middle-aged and older (50+) people of color and 53 percent of middle-aged and older whites. These

opinion gaps present an enormous opportunity for young voters to put climate on the ballot in 2015. But the power to force such action by our elected leaders lies, first and foremost, in voting.

Low turnout among young people has been a problem for decades—and it's a major reason why it often seems like politicians aren't responding to the concerns of younger generations. Simply put, most elected officials pay little attention to the needs and concerns of people who do not vote.³²

Young people's voting power can be a major force for achieving a future that is equitable, opportunity-rich, and as safe as possible from the catastrophic risks of climate change. The opportunity is there—but only if young people turn out to vote in record numbers in 2016. That's the way for millennials to ensure that their voices are heard at this pivotal turning point for their own future, and for the future of our nation.

Millennials now equal Baby Boomers as a share of eligible voters, which should give them the power to demand real solutions for the problems they uniquely face. But their numbers can't drive change if they do not vote.

APPENDIX

DATA

For our estimation exercise, we relied on two main data sources:

- The projected per capita GDP with and without climate change (for the period 2010-2099) are borrowed from Burke, Hsiang, and Miguel (2015). The projections are in turn based on SSP5 of the Shared Socioeconomic Pathways database and on RCP8.5 of the Representative Concentration Pathways.
- The second source of data is the the Current Population Survey (CPS) produced and distributed by Minnesota Population Center (2010), which was used for wage income data.
- Estimates for real wage increase projections were taken from the Social Security Administration's Trustees Report, using the projections from their "intermediate" scenario.

METHODOLOGY

From the illustration provided in the descriptive data, the gap between GDP/Capita without climate change and GDP/Capita with climate change is increasing over the years. We use the percentage change between the two to estimate the change in individual wage income under the scenario of climate change. We assume the relationship between the change in GDP/Capita and the wage income is linear.

The loss of wage income at any given year is derived as follow:

$$Loss\ of\ wage\ income(t) = (1 - \frac{GDP\ Cap_{ClimateChange}(t)}{GDP\ Cap_{BaseScenario}(t)}) * WageIncome(t)$$

We assume that the distribution of wages by age will not change over time. Wages are then adjusted to constant 2015 dollars. To take into account real wage growth we multiply the above equation by the 1.2 percent, derived from the Social Security Administration's calculations.

We also calculate the future value of the lost income from saving due to lost wages. We assume each age would have saved 12 percent of the lost wage income. We then estimate that this lost savings would have earned returns averaging 3.5 percent annually, in real terms, until retirement.

$$FV_{age} = LostIncome_{age} * (1 + 0.035)^N,$$

N = number of periods (years) before retirement

RATIONALE

We use wage income instead of personal income (which includes wage income), because asset income (the other major source of personal income) can have varying geographical sources, hence it won't be a reliable indicator if we are solely interested in studying the effects of temperature changes on productivity of a certain geographical area, in our case the United States.

Why do we use median wage income instead of mean wage income? As a measure of central tendency, the mean can be significantly impacted by outliers. For wage income, this is often the case, particularly when looking at the wage income younger or older workers.

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