



FACTS TEXAS

A M E R I C A N S E C U R I T Y P R O J E C T

Pay Now, Pay Later: Texas

Various climate change models predict a sea level rise of 1 to 3 feet over the next 100 years; a sea level rise of 3 feet would wipe out South Padre Island and much of Galveston.¹

Damage to homes and buildings affected by hurricane flooding in the Corpus Christi area is expected to rise 60-100% by 2030 and more than 250% by 2080.²

Texas has more renewable energy potential—via wind, solar, and biomass—than any other state in the country,³ and is currently the nation's largest producer of wind energy. The majority of these renewable resources, however, remain untapped.⁴

According to a new study, a failure to mitigate the effects of climate change could begin to cause serious gross domestic product and job losses within the next several decades. Between 2010 and 2050, it could cost Texas \$137.8 billion in GDP and over 1 million jobs.*

**GDP numbers are based on a 0% discount rate. Job losses are measured in labor years, or entire years of fulltime employment. Backus, George et al., "Assessing the Near-Term Risk of Climate Uncertainty: Interdependencies among the U.S. States," Sandia Report (Sandia National Laboratories, May 2010), 141. https://cfwebprod.sandia.gov/cfdocs/CCIM/docs/Climate_Risk_Assessment.pdf (accessed March 23, 2011).*

Admittedly, the effects of climate change, a complex and intricate phenomenon, are difficult to predict with precision. Informed scientific and economic projections, as we have used in our research, however, allow us to see that Texas faces significant losses in industries crucial to its economy if no action is taken.

Moreover, data shows that Texas is poised to benefit from the research, development, and distribution of renewable energy technologies. For example, a single acre in West Texas (which includes more than 84 million acres) can produce the energy equivalent of 800 barrels of oil annually using solar power.⁵ Should we fail to take action against climate change, Texas residents would have much to lose.

Pay Later: The Cost of Inaction

Climate change will introduce hotter summers, longer droughts, and more frequent, intense weather events—such as hurricanes—to Texas. While Texas is no stranger to heat or hurricanes, the increased intensity will add to the high costs of mitigating their negative effects.

Costs to the Texas Coastline

Stretching 600-miles,⁶ the Texas coastline is home to thousands of residents and wildlife. Nearly a quarter of the state's population lives in the counties along the Gulf of Mexico, where much of the state's industry is based.

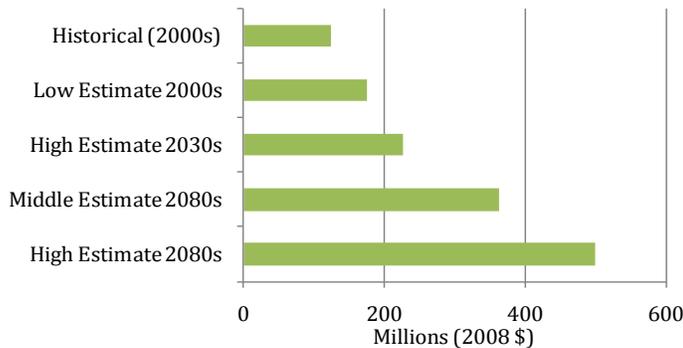
More than half of U.S. chemical and petroleum production is located on the Texas coast, and over 66

million short tons of cargo—valued at more than \$25 billion—traverse the 420-mile Texas segment of the Intercoastal Waterway each year.⁷ Additionally, the coastal ecosystem adds more than \$12 billion annually to the Texas economy through tourism, fishing, and other coastal activities.⁸

Texas is poised to benefit from the research, development, and distribution of renewable energy technologies. For example, a single acre in West Texas (which includes more than 84 million acres) can produce the energy equivalent of 800 barrels of oil annually using solar power.

However, the Texas coast is threatened by rising sea levels due to climate change. If we fail to take action to curb emissions, the Gulf Coast sea level is expected to rise 1 to 3 feet over the next 100 years. **Should the sea level increase by a mere foot, water would cover more than 400 square miles of the Texas coastline; a three-foot rise would cover around 1,000 square miles.** (Dallas, by comparison, comprises 380 square miles.) The coastline of Texas is particularly vulnerable as it sweeps gradually into the sea, much lying 5 feet or less above sea level. **A sea level rise of 3 feet**

Cost of 1967's Hurricane Beulah on Corpus Christi under Climate Change Scenarios

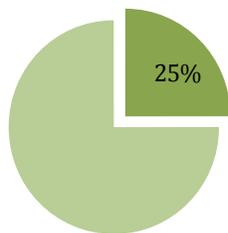


Source: Bipartisan Policy Center and the National Commission on Energy Policy

would therefore destroy South Padre Island and much of Galveston.⁹

Not only would this be a devastating loss of habitat and homes, but it would have a significant economic impact as well. The three-county Galveston Bay region alone has a combined population of more than 4 million, who collectively earn \$183.2 billion—**If sea levels rise by just over two-thirds of a meter, 78% of the region's households will be displaced while \$9.3 billion of infrastructure would be lost.**¹⁰

Texan Population Projected to be Directly Affected



Source: Schmandt et al¹¹

As the climate changes, the Texas coast will also become increasingly vulnerable to hurricanes, both from increased intensity and lowered protection. Sea level rises would cancel out the defense provided by the barrier islands and wetlands against these devastating storms. Additionally, these natural barriers would shrink just as the severity of hurricanes is expected to increase, as predicted in most climate change models. **Hurricane intensity is projected to increase by about 8% for every 1.8°F increase in sea surface temperature. As a result, hurricane flood levels are projected to rise 3-27% by 2030 (depending on emissions levels) and structural damage is predicted to rise an average of 60-100%.** Under various climate change scenarios, damage from hurricanes later this century are projected to be significantly worse than that caused by 1967's Hurricane Beulah.¹³ If Hurricane Ike were to strike in the Galveston Bay area following a .69 meter rise in sea level it would equate to \$16.8 billion in damage costs—an amount equal to about two months of state sales tax receipts.¹⁴ Hurricane Rita, in 2009, exceeded this amount.¹⁵

Costs to Rural Areas and Wildlife

The resulting loss of habitat and wildlife could negatively affect the Texas tourism industry, which contributed around \$8.4 billion in 2006 through hunting, fishing, and wildlife viewing.¹⁶ Thanks to the rich variety of ecosystems present, only the State of California boasts a greater number of species than Texas. Climate is a key determinant in the distribution of all of these species.¹⁷ However, changing conditions and harsher weather due to climate change are expected to damage wildlife, as well as agriculture, forestry, and other industries that are heavily dependent on the weather and natural environment. Higher temperatures and sea level rise have the potential to change whole ecosystems and may force species that are native to Texas, or that migrate there annually, to move to cooler climates.¹⁸

The \$21 billion agriculture and livestock industry¹⁹ is also likely to face hardship as harsher weather and longer, drier seasons brought by climate change become more frequent. Agricultural regions in west and south Texas will likely be most affected, as water is already relatively scarce in these areas. Texas may need to adapt by shifting to crops that can withstand the drier conditions.²⁰ Farmers specializing in wheat production, for example, may be forced to choose other crops to cultivate. **Texan net agricultural income could fall by 16-29% within the next two decades.**²¹

A Hot, Hot Metropolis

Climate change promises to introduce longer, hotter, and more frequent heat waves over time. While Texas is no stranger to blazing hot summers, the increased heat promises to strain health and water resources while

increasing pollution, particularly in cities. For instance, increased heat will only create more “ozone action” days that inevitably lead to an increased number of asthma attacks, hospitalizations, and higher health costs.²² In addition, **Dallas and Houston already suffer an average of 28 heat-related deaths annually; this number could shoot up to 60-75 deaths per year with a mere 3°F increase in average summer temperatures.**²³

Electricity consumption in the state is closely tied to temperature. **It is estimated to cost \$21-45 billion from 2000 to 2050²⁴—approximately \$850-1,800 per person based on the current population of Texas²⁵—constructing new electricity generating capacity to meet the growing demand.**

Texas will also find it increasingly difficult to manage its freshwater resources. The competing demands for this basic resource are expected to pose a challenge with or without climate change, as the population of 24.8 million²⁶—around 85% of whom live in urban areas—is projected to grow to 34 million by 2030. Climate change is only expected to exacerbate this problem, as freshwater resources are predicted to decrease just as the state’s demand increases.²⁷

Given the more serious threat climate change poses to sub-tropical regions, a likely increase in Latin American migrants crossing the border will also place not only a burden on water supplies, but also Texan communities, necessitating, for example, an increase in law enforcement spending.

Pay Now: The Benefits of Taking Action

Texas stands to lose part of its traditional income by mitigating the long-term effects of climate change; after all, the state’s economy is closely tied to energy development and manufacturing, both of which are high emissions-producing industries. According to one study, Texas stands to lose between 144,597 and 196,928 jobs and \$30-41 billion in gross state product in 2030 should the state have significant greenhouse gas emissions standards imposed.²⁸

Fortunately, Texas is also positioned to benefit from further developing renewable energy resources. **Texas has more renewable energy potential—wind, solar, and biomass—than any other state in the country.**²⁹ Moreover, though Texas has not yet fully tapped into its potential, there were over 55,600 jobs in the green economy in 2007.³⁰ Texas has the opportunity to make a significant impact on global greenhouse gas emissions, as it is the largest emitter of greenhouse gases in the United States; if it were a country, it would be the seventh-largest emitter in the world.³¹

Texas is already using some of its renewable resources, particularly wind power. With more than 9,410 MW of wind power installed, Texas leads the nation in wind energy³²—but with an estimated 1,190 billion kWhs of potential annual wind energy,³³ it has plenty of untapped wind resources. Renewable resources other than wind remain virtually unexploited, despite the vast resources available—especially solar power.³⁴ **The solar energy on a single acre of West Texas land can produce the energy equivalent of 800 barrels of oil annually.**³⁵

Texas has 4,300 quads per year available of potential solar energy (or 250 quads per year based on currently available technologies).³⁶ One quad of



Energy Resource	Major Electric Power Plants (≥100 MW)	Renewable Energy Potential
Coal Mine, Surface	Coal	Biomass (≥ 50 tons/sq km/yr)
Coal Mine, Underground	Geothermal	Geothermal (≥ 80 milliwatts/m2)
Natural Gas Hub	Hydroelectric	Solar (≥ 6.0 kWh/m2/day)
Petroleum Refinery	Natural Gas	Wind (≥ 3 Power Class)
Oil Import Site	Nuclear	
Oil Seaport	Petroleum	
Electricity Transmission Line (≥ 345 kV)	Solar	
Natural Gas Flow (1 mile band width = 100 million cubic feet/day)	Wind	
Oil and Gas Active Leases	Wood	
	Other Renewable	

energy is sufficient to serve the annual energy needs of around three million people.³⁷

Additionally, Texas enjoys abundant biomass energy resources, thanks to its healthy agricultural and forestry industries. Without conflicting with food or feed production, biomass could provide around 15% of the state’s demand for liquid fuel.³⁸

Conclusion

Texas must consider action on climate change not just in terms of cost, but in terms of opportunities. If we give Texas’ population, businesses, and investors clear and consistent signals by properly offering initiatives and cultivating demand, investment and innovation in renewable technologies will follow.

Texans will have to pay for the effects of climate change. The only remaining question is whether they will pay now, or pay later and run the risk of paying significantly more.

(Endnotes)

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