# Texas Advanced Manufacturing Plan

A Briefing from The Dow Chemical Company

# Overview

*The Need for a Strong Manufacturing Sector in Texas* ..... *pg. 3*
*Energy Policy* ..... *pg. 4*
*Education and Workforce* ..... *pg. 10*
*Regulatory Reform* ..... *pg. 13*
*Tax Policy* ..... *pg. 15*

# The Need for a Strong Manufacturing Sector in Texas

There is no doubt that Texas is one of the best places in the world to do business. Its economy is strong and diverse, and is growing at a rate that significantly outpaces the national average. Texas added more than 300,000 new jobs in 2017, and since January 2017 Texas has added more than 435,000 private-sector jobs.

Texas has one of the largest and most diverse economies in the world. Taken as a stand-alone economy, Texas would rank as the 10th largest economy in the world, just behind Spain and Canada, and ahead of Brazil, the Republic of Korea, and India – according to data from the World Bank. In fact, the Houston metro area alone has a near equivalent GDP as Argentina, and the Dallas-Fort Worth metro area would rival the entire country of Nigeria.

At the heart of the world's 10th largest economy is manufacturing. From chemicals to petroleum products and automobiles, manufacturing employs more than 7 percent of Texas' total workforce. Manufacturing has the highest multiplier effect of any industry; for every 1 job created in manufacturing an additional 4-5 jobs are created in the broader economy. As a result, an even greater number of Texas residents are employed by organizations that support the state's manufacturing base.

## Dow's Operations in Texas

Dow Texas Operations in Freeport is Dow's largest integrated manufacturing site, and the largest single-company chemical complex in the world. It manufactures over 40 percent of the products Dow sells in the U.S. and 20 percent globally.

Dow first came to Texas in 1940, building a plant in Freeport to extract magnesium from seawater. The company's presence in the state has continued to grow through the years, and now it calls Beaumont, Deer Park, Freeport, Houston, Orange, La Porte, Seadrift and Texas City home.

Dow facilities in Texas produce billions of pounds of products each year that enhance the quality of life for people around the globe. Dow products serve virtually every consumer market ranging from food to building and construction and from health and medicine to transportation. These products are used in a variety of end-use products – office supplies, mouthwash, pharmaceuticals, computers, furniture, paints, carpet, garbage bags, cosmetics, chewing gum, lozenges, cleaning products, and packaging for countless products and food.

## What Constitutes an Advanced Manufacturing Plan?

The Advanced Manufacturing Plan for Texas is meant to provide a framework from which policymakers and businesses together can strengthen the Texas economy and its backbone: manufacturing. The plan presents Dow's positions and recommendations on a range of policies and programs that play a significant role in the ability of Texas manufacturers such as Dow to support and grow their operations, increase employee numbers, and expand their role in communities across the state.

By its very nature, an advanced manufacturing policy is a collection of other policies. To strengthen the economic base, create jobs, and enable industry to increase its competiveness, policymakers must address a range of issues that both directly and indirectly enable the growth of advanced manufacturing. Dow believes Texas must address four policy areas that are crucial to the long-term success of the state's manufacturers:

- Energy Policy
- Tax Policy
- Regulatory Reform
- Education and Workforce Development

Just as American manufacturing looks drastically different today than a century ago, manufacturing in Texas, too, must continue to evolve. We must be prepared to bring important issues to the table; Dow considers them all a part of a broader effort to building a stronger and more vibrant future for Texas. We recognize that policy reforms can be difficult, but Dow firmly believes progress across all of these important public policy areas is achievable. By reinforcing that Texas is open for business, policymakers can enable the creation of more jobs, spur investment, and boost state and local economies.

Texas is already a national leader in manufacturing competitiveness, but there is more that can and should be done. With the right policies in place, Texas can continue to redefine and diversify its manufacturing base to usher in a new era of economic prosperity. Dow's Advanced Manufacturing Plan for Texas provides a comprehensive set of policies that can help lead the way to a strong and prosperous future for Texas manufacturers.

# Energy Policy

## Overview

Advanced manufacturers such as Dow operate at the nexus of energy and manufacturing, and need sound energy policy to remain globally competitive. As the global population grows and incomes rise, the demand and competition for energy will dramatically increase. The challenges presented by this growth in energy demand must be met head-on, and states must play a critical role. With an eye to the future, Texas can strengthen its role as a leader in competitive energy policies.

Texas is resource-rich in oil and natural gas. It leads the nation in energy production and provides more than one-fifth of the country's domestically produced energy. The state leads the nation in crude oil reserves and production with more than one-third of all U.S. crude oil proved reserves. Texas also produces more crude oil than all of the federal offshore producing areas. It leads the nation in oil-refining capacity with three-fourths of the country's total. It also holds one-fourth of the nation's proved natural gas reserves and is the country's largest producer.

Texas is also a national leader in renewable energy development. Texas has established itself as the nation's leader in wind generated electricity with one-fourth of the U.S. total in 2016, according to the U.S. Energy Information Administration (EIA). In fact, in 2011 Texas became the first state to reach 10,000 megawatts of installed wind generating capacity. While wind accounts for nearly all of the renewable electricity generated in Texas, the state also has potential in other renewable generation, including solar and biomass.

With over 46,000 miles of transmission lines and 570 generating units, the Texas electricity system is one of the largest and most complex in the country. The vast majority of the state falls within the grid managed by the Electric Reliability Council of Texas (ERCOT). ERCOT manages the flow of power for more than 24 million Texas customers representing 90 percent of the state's electricity load. A portion of East Texas with a substantial manufacturing presence lies outside of the ERCOT area and is served by a vertically integrated utility. This area is part of the Midcontinent Independent System Operator (MISO) grid.

With electricity demand in the area served by ERCOT setting new peak-load records in the summer of 2018, changes to the system have significant impact on energy-intensive manufacturers. As the system continues to transform, government and industry must take action to ensure that the competitive market provides appropriate incentives for new generation development and a reliable power supply.

Reliable, affordable energy is a key to economic growth, and sound energy policy can strengthen the economy and increase and diversify supplies. At Dow, we believe the future of energy is connected to innovative technologies and materials from chemistry, and that energy policies at all levels of government should focus on these fundamental principles:

1. **Cost-Effective Energy Supply:** Pursue efficient electric pricing through well-structured competitive markets and effective oversight of regulated utility providers while eliminating out-of-market subsidies or mandates.
2. **Transmission Planning and Reliability:** Pursue a robust, cost-effective transmission grid to deliver the most efficient power supply to customers in all areas and maximize the economic use of available generation, while ensuring appropriate oversight of transmission costs.
3. **Optimizing Hydrocarbons:** Optimize, increase, and diversify domestic hydrocarbon resources and promote efficient pipeline and storage infrastructure.
4. **Demand Response, Energy Efficiency and On-Site Generation:** Promote demand response, energy efficiency, and on-site customer resources as competitive alternatives to building new large-scale electric generation.
5. **Renewable Energy:** Facilitate ongoing development of renewable energy, new technologies, and energy alternatives by eliminating barriers to entry and promoting research and development, while minimizing out-of-market subsidies or mandates.

## Cost-Effective Energy Supply

ERCOT's unique "energy-only" market design ensures maximum performance from market generators by rewarding them for providing energy and reliability services during critical periods of peak demand. This competitive market design creates unique opportunities for large manufacturers to contract for tailored power supplies based on their specific needs. It also allows them to participate directly in the market by providing excess energy or reducing consumption. ERCOT is one of the few competitive electric grids in the world that has not adopted a mandatory forward capacity auction. In a forward capacity auction, all generators in the market are paid a set amount each year for providing installed generating capacity, regardless of the amount of energy they actually produce. As a result, the ERCOT market provides unique flexibility for industrial customers to effectively manage their electricity costs, and serves as a useful model for other regions.

### Transparency in Ratemaking

In areas where utility services remain fully regulated, such as the service area in east Texas, it is critical to ensure that monopoly rates are subject to routine customer review and regulatory oversight. Ratemaking mechanisms that allow utilities to automatically increase their rates without a rate case or rely on projected costs, such as forward test years or formula rates, shift considerable risk to customers and increase costs for manufacturers. These types of policies have generally been rejected in Texas, which is a major reason why Texas's electric costs remain among the lowest in the country.

**The Solution:**

- Promote ERCOT's competitive energy-only market design, and oppose forward capacity auction mandates.
- Pursue reasonable oversight of regulated utility rates and services. Oppose forward test years, formula rates, or other automatic rate adjustments that reduce utility accountability and oversight of monopoly rates.
- Seek transparency in the utility ratemaking process.

## Transmission

A robust, cost-effective transmission grid facilitates a reliable electric supply, promotes competition, and allows the most efficient generation resources to serve customers in all areas of Texas. Transmission should enable delivery of economic energy to key growth areas in the state, including the Houston Ship Channel and the Texas Gulf Coast. A healthy transmission grid allows economic generation resources to compete to serve customers, reducing overall system costs and increasing efficiency. While a robust, reliable transmission grid is critical to continued industrial growth in Texas, policies should also ensure that transmission rates remain reasonable.

*Planning*

Certain areas of the state, including areas around Houston, have inherent limitations on new generation development due primarily to land use and environmental restrictions. In order for these areas to remain economically competitive, it is imperative to promote transmission policies that maintain reliability, alleviate congestion, and allow efficient generation to reach these key growth areas. Transmission that pays for itself by producing a more efficient, lower-cost dispatch of generation should be a priority in Texas.

Maintaining state jurisdiction over transmission rates while optimizing import/export capabilities is also important to ensuring reasonable electric costs. In areas outside of ERCOT, transmission-only utilities are under Federal Energy Regulatory Commission (FERC's) ratemaking jurisdiction. FERC's transmission planning and ratemaking policies are very different from those in the rest of Texas. Ceding jurisdiction over electric rates to FERC in these areas could substantially increase rates for customers.

*Reliability*

As Texas continues to drive policy that ensures a reliable transmission network, special consideration should be given to emergency response protocols. To prevent system impact during emergency scenarios, Transmission and Distribution Providers (TDPs) can disconnect industrials from the grid under certain circumstances without warning or notice. Given the sensitivity of the operations for many industrials, modifications should be made to the protocols or Public Utility Commission of Texas (PUCT) rules to mandate coordination with industrials if ERCOT or the TDP determines a load needs to be disconnected from the grid to avoid safety issues.

**The Solution:**

- Promote transmission planning policies that foster statewide reliability and reduce overall energy costs for customers.
- Ensure appropriate oversight of transmission development and regulated rates, including maintaining state jurisdiction in the areas outside of ERCOT.
- Modify electrical emergency reliability-based response policy to require coordination with manufacturing plants (if directly impacted) to avoid safety issues.

## Optimizing Hydrocarbons

As we seek to diversify energy sources and foster a sustainable economy, hydrocarbon resources will continue to play a significant role in meeting growing energy demands.

Hydrocarbons provide critical feedstock for the manufacturing of products and solutions that drive economic growth and innovation. These resources enable many of the products that advanced manufacturers, such as Dow, produce for renewable technologies, including photovoltaics, wind turbine blades, and energy-saving insulation. A diverse, sustainable energy solution should maintain a competitively neutral market for hydrocarbons along with other energy resources.

*Natural Gas*

Advancements in the recovery of unconventional shale gas are powering a manufacturing resurgence in the U.S., resulting in billions of dollars of new investment and thousands of new jobs. These abundant supplies of unconventional natural gas will be an important resource for the U.S. over the coming decades, and Dow supports environmentally responsible methods of bringing these resources to market. According to the EIA, Texas has one-fourth of the country's proven natural gas reserves and leads the nation in production. The amount of natural gas used for electricity generation in Texas is greater than in any other state and accounts for almost one-sixth of the total used by the nation's electric power sector.

Texas has a robust network of more than 45,000 miles of interstate natural gas pipelines and has more natural gas market hubs than any other state. As a result, Texas is well-connected to natural gas markets throughout the country. In addition, Texas's 36 active storage facilities account for nearly 10 percent of the country's natural gas storage capacity. This robust pipeline and storage network enables Texas – and the U.S. Gulf Coast region – to be one of the most attractive places in the world for new manufacturing investment.

**The Solution:**

- Enhance policies to ensure continued affordable access to the vast source of natural gas located in the Permian and Eagle Ford basins among others.
- Develop clear, science-based policies to resolve environmental, regulatory and other uncertainties in public opinion around use of the hydraulic fracturing process.
- Encourage and accelerate the adoption of available water treatment technologies, especially those for fracturing water recycling and reuse.

### Demand Response, Energy Efficiency, and On-Site Generation

Energy is a key enabler of economic growth. As such, cost-effective energy efficiency and demand response remain critical to meeting growing energy needs with the lowest overall cost to society. The cheapest, cleanest, and most abundant energy is the energy we never use. Cost-effective, market-based energy efficiency and demand response are generally the simplest and most affordable way to reduce energy demand and avoid the need for new generation development. Texas is a recognized leader in developing policy and investing in programs to encourage energy efficiency and demand response.

Cost-effective energy efficiency can reduce energy demand and avoid the need for new generation. Large industrial customers such as Dow have strong incentives to minimize their energy use to remain competitive, and generally do not need mandates or subsidies to pursue energy efficiency initiatives. Texas has recognized this by allowing industrial customers to manage their own energy efficiency initiatives outside of the statewide mandate, which optimizes overall results.

***Demand Response***

ERCOT has the world's leading demand response platform for industrial customers. The competitive ERCOT market allows customers to provide "Emergency Response Service" (ERS), "Responsive Reserve Service," and other reliability services by voluntarily reducing load in response to a request from ERCOT. These services are compensated as substitutes for generation, and reduce energy needs and energy costs throughout the ERCOT footprint. ERCOT also allows large customers to contract with their electric providers to receive payments for reducing their load during peak periods, maximizing the incentive for customers to curtail during critical system demand. This construct should be strongly supported and used as a model in other jurisdictions. While current demand response opportunities are less sophisticated in the ETI service area (within MISO), load interruptibility can play a key role in the future.

**The Solution:**

- Ensure that demand response is properly compensated in energy markets and can actively compete with generation on a level playing field, while disfavoring out-of-market subsidies or market interference.
- Promote the implementation of cost-effective smart grid technologies that improve customers' ability to manage their electricity costs.

### Building Codes

The building sector is the largest consumer of energy, and regularly updating and strengthening state building codes to encourage efficiency will help reduce Texas's demand for energy and avoid the need for electric generation.

According to the American Council for an Energy Efficient Economy's 2017 Scorecard, Texas ranks 26th in the U.S. in energy efficiency.

Updated building codes drive structural, electrical and mechanical improvements that enhance safety and make buildings perform more effectively across all sectors of the construction industry. Delays in adopting code updates would affect building performance and energy efficiency in Texas well into the future. Fortunately, the American Council for an Energy Efficient Economy gives Texas high marks for building energy efficiency because of its requirement for single-family residential homes and commercial and multifamily buildings to comply with their respective 2015 codes.

Model energy efficiency codes are updated through a collaborative process of the nation's leading experts in energy efficiency, building design and product performance professionals, state and local governmental officials, product manufacturers, architects, and builders, including representatives from Texas. The updated codes reflect the latest advances in building products, science, and construction practices that states can adopt and implement.

The adoption of uniform and recommended standards is imperative to provide consumers and corporations with energy savings, improved safety and increased building performance for years to come. We applaud Texas for adopting updated building codes and encourage regulators to remain on the leading edge.

**The Solution:**

- Collaborate with stakeholders to establish innovative and effective energy efficiency financing mechanisms for residential and consumer buildings.
- Regularly update and strengthen state building codes to ensure large-scale energy savings through efficiency in new building construction. Additionally, policies should promote efficiency upgrades in existing buildings and homes.
- Develop a process for automatic adoption of noncontroversial building code updates.
- Strengthen the code adoption process by ensuring that the adoption of new codes does not weaken energy efficiency codes.

*On-Site Generation*

Advancing integrated cogeneration for the industrial sector is a key way to encourage energy efficiency. On-site generation, including cogeneration and distributed resources, are a critical part of ensuring a reliable and economic energy supply.

According to the EPA, the average efficiency of fossil-fueled power plants in the U.S. is 33 percent. By putting the wasted heat to use, combined heat and power (CHP) is estimated to offer thermal efficiency between 60 and 80 percent. There are presently 130 CHP installations in the state with a generating capacity of 17,612 MW, according to the U.S. Department of Energy.

To promote cost-effective resource development, it is also imperative for regional grid operators and state regulators to adopt policies that are not unduly burdensome for on-site generation, and that allow customers to reasonably realize the savings and flexibility these installations can provide. This includes reasonable net-metering policies and registration requirements. In ERCOT, many customers are now pursuing distributed generation and on-site solar and storage solutions as these technologies become more competitive and economic. This type of development will play a key role in ensuring adequate generation supply and system reliability in Texas moving forward, and any arbitrary impediments should be eliminated.

**The Solution:**

- Enhance policies to facilitate efficient on-site generation in the industrial sector, including use of CHP and waste-heat recovery. Eliminate arbitrary requirements that impede the development of self-generation such as prohibitions on net metering or burdensome registration and modeling standards.

## Renewable Energy

Dow believes that any comprehensive energy plan should recognize the important role renewable energy sources can play in a cost-effective, sustainable energy future. The cost of renewable generation has become increasingly more cost-competitive in recent years, particularly in the ERCOT region.

With over 23 gigawatts of installed wind capacity, Texas has more wind power than all but five countries, according to the American Wind Energy Association. Wind energy has provided as much as 54 percent of system electricity within ERCOT, and provided more than 15 percent of all in-state electricity generation in 2017. Texas is one of 37 states to adopt a renewable portfolio standard (RPS). Texas implemented its renewable energy mandate in Section 39.904 of the state's Public Utility Regulatory Act, which established escalating renewable energy goals ultimately reaching 10,000 MW of installed renewable capacity by 2025. However, as a world leader in wind energy production, Texas exceeded that goal in 2010 and has continued to develop additional wind generation without relying on state mandates. Renewable power now contributes one-seventh of the state's net electricity generation and represents more than one-sixth of the entire country's total electricity generation from non-hydroelectric renewable sources. Notably, Texas has produced more non-hydroelectric renewable generation than any other state in the country.

Wind energy is also providing environmental benefits in Texas because wind power creates no emissions and uses very little water. In 2017, wind power resulted in a savings of 23.4 billion gallons of water consumption and avoided 48.4 million metric tons of carbon dioxide emissions, according to the American Wind Energy Association. That is the equivalent of more than 10 million cars' worth of emissions.

As wind generation increases, its intermittency can present challenges in ensuring grid reliability. Wind output does not reliably correlate with periods of peak usage. As a result, a cost-effective mixture of renewables, base load generation, and cogeneration is important to ensuring a reliable electric supply for Texas businesses. Storage solutions may also allow wind to become more dispatchable, and should be researched and developed in the competitive market. Solar generation correlates more closely with peak demand, and may also provide a complementary source of generation.

Policies to facilitate renewable energy development in Texas should focus on boosting research and development and eliminating barriers to entry, while avoiding market-distorting mandates or subsidies. Financing options that spread the capital costs and benefits over the life of a renewable generation project can also provide greater incentives for market participants to pursue renewable technologies. Advanced manufacturers are developing the next generation of clean energy technology. Innovation is already making alternative and renewable energy solutions more efficient and affordable. Facilitating competitive, cost-effective renewable energy growth is an important factor in energy security, economic growth and environmental sustainability throughout the country.

**The Solution:**

- Promote research and development of renewable technologies.
- Eliminate barriers to entry for all new technologies, including renewables and complementary storage installations.
- Facilitate economic, competitive renewable generation development while avoiding market-distorting subsidies or mandates.
- Support continued development of cogeneration as a complement to base load generation in managing the reliability impacts of wind and solar generation.

# Education and Workforce

## Overview

To compete and win in the global economy, Texas-based manufacturers must be able to attract the best and brightest people to live and work in Texas. That concept is simple, but the pathway to actually achieving it takes commitment from employers, policymakers and the public to build an inclusive workplace.

Dow deeply values integrity and respect for all persons in every country, state, and locality where our employees live and work. All employees should have the right to be themselves, and bring their whole selves to work every day. Likewise, communities are made stronger with full inclusion and equal treatment to all. We must be inclusive in what we do together. Our Employee Resource Groups (ERGs) help us achieve this goal by playing a critical role in helping increase employee engagement and executing against business objectives.

As the job market becomes more competitive and professionals look at career opportunities, the environments in which they work will be increasingly important. Building an inclusive and diverse workforce is not only the right thing to do, it is the smart thing to do. As Texas continues to grow and in order to attract the workforce for tomorrow, the state must foster workforce policies that attract the most talented people in the world to work, live and invest here.

Reliable, affordable energy is a key to economic growth, and sound energy policy can strengthen the economy and increase and diversify supplies. At Dow, we believe the future of energy is connected to innovative technologies and materials from chemistry, and that energy policies at all levels of government should focus on these fundamental principles:

### STEM and Skilled Trades

The growth and sustainability of America's manufacturing sector requires a diverse workforce with skills in science, technology, engineering and mathematics (STEM) fields across the entire K-20 educational spectrum. It begins with developing an interest and solid foundation in STEM early on, and providing opportunities to continue to develop skills that are directly applicable to careers in industry.

For manufacturers, the most critical shortage is in the middle skills, or skilled trades, which we know can be alleviated through apprenticeship programs and other Earn-While-Learning career pathways. Apprenticeship programs are a proven solution for recruiting, training, and retaining world-class talent. This approach is broadly sponsored by employers, community colleges and universities, workforce investment boards, industry associations, and the military. In addition, flexible, stackable credentials with hands-on industry experience that lead to degrees or certifications in the skilled trades should be encouraged as an important way to ensure consistency across a complex sector like manufacturing, leading to faster up-skilling for the new careers created by automation, and more mobility for the workforce of the future.

For advanced science and engineering skills such as those needed in research and development, universities must be able to equip enough students with skills that they can apply to real-world scientific challenges industry faces. In addition, this mobile, well-educated population must be attracted to work and live where industry is located.

As the second most populous state in the country with one of the best business climates, Texas is well-positioned to lead in STEM and manufacturing education, better preparing its workforce for modern, 21st century employment opportunities.

A recent report from the U.S. Department of Commerce found that employment in STEM sectors has grown nationally by 24.4 percent since 2007, compared to 4 percent growth in non-STEM sectors. The STEM workforce's median salary is, on average, 29 percent higher annually than the non-STEM workforce salary.

This national trend of higher salaries in STEM fields applies to jobs in Texas. The Organization for Economic Co-operation and Development (OECD) found in 2012 that Texas was projected to have 10 percent of the country's new STEM jobs, and this is proving true as many Texas cities have become hubs for STEM opportunities. A 2018 review of the geography of American STEM hubs placed three Texas cities within the top 40, with Austin 4th, Houston at 21st, and Dallas at 40th. In addition, Houston had the highest median income for STEM workers anywhere in the country, with Dallas ranking 5th.

Given these growing opportunities in STEM fields and Texas's existing footprint in the space, it is critical for the state to continue strengthening its education system. Texas is poised to lead the country in STEM opportunities, specifically in manufacturing, making it all the more important to continue to build on its momentum.

Two examples of impactful programs in Texas are Texas Science, Technology, Engineering and Mathematics (T-STEM) Academies and the informal afterschool STEM sessions and mentoring offered by Communities in Schools of the Dallas Region (CISDR).

- T-STEM Academies are rigorous secondary schools focusing on improving instruction and academic performance in science and mathematics-related subjects and increasing the number of students who study and enter STEM careers. This Texas Education Agency (TEA) initiative to improve STEM resources for Texas secondary schools has emerged as a sound plan to address these issues. The initiative identifies individual schools and districts who have high opportunities for and interests in STEM, and provides grants and technical assistance. Crucially, the initiative emphasizes college and workforce readiness rather than just elevating state test scores. The initiative also focuses on first-generation, minority, and low-income students, rightly seeing STEM as an emerging pipeline that can generate success and fulfilment within these oft-neglected groups. By encouraging private-public partnerships and input from local Texas STEM businesses, the initiative takes a holistic, multilateral approach that benefits all parties. T-STEM is an excellent step towards reversing some of the negative education trends that have arisen in Texas.
- Communities in Schools of the Dallas Region (CISDR) is a powerful local example of how community stakeholders can work together to improve the local student talent pipeline. CISDR offers informal afterschool sessions involving STEM activities and mentorships from experts in the field. Their mission is to specifically focus on younger, disaffected children in minority and low-income districts. CISDR partnered with STEM-based corporations to energize young students about different career paths. By identifying gaps and prioritizing at-risk students, CISDR reinforces Dow's beliefs in the power of STEM education and workforce development.

**The Solution:**

- To fully take advantage of its ripe business culture and growth of STEM and manufacturing fields, Texas must treat education as a critical investment in its future workforce. Fostering a high-quality STEM education system and a steady talent pipeline requires government, industry, and communities to cooperate and engage. Programs that can more quickly retool the labor force by focusing on re-training and credentialing at the level of skills in demand rather than multi-year degrees could be important.
- Funding for innovative secondary and postsecondary career and technical education (CTE) components is essential with an emphasis on hands-on training programs, such as apprenticeships.
- The private sector can help improve Texas' STEM competitiveness by offering workshops and site visits for teachers and students. By emphasizing public-private collaboration, students and teachers see firsthand how STEM skills translate from classroom to laboratory. This creates a unified mission and purpose among these groups and improves school retention, performance, and graduation rates.
- While continuing to support initiatives like T-STEM and private initiatives like CISDR, the Texas Legislature is urged to consider investing more in education strategies that prioritize college-readiness and workforce development with hands on industry experiences, like apprenticeships.

## Dow Is Leading by Example

Texas is home to Dow's largest industrial site and has been a pillar for the company's U.S. operations since the 1940s. The continued successful growth and development of our business in the state is largely dependent on the ability to leverage local talent pipelines. As an organization, we have worked both locally and nationally to provide solutions to address the widening skills gap present in STEM and the skilled trades.

- **Apprenticeship Program Career Pathway:** Dow employs thousands of manufacturing operations technicians and skilled trade workers globally. Our global portfolio of Apprenticeship Programs is one mechanism for supporting our future talent pipeline for these manufacturing roles. These programs include both formal education, in partnership with local educational institutions, and on-the-job training. Currently Dow has hundreds of apprentices globally, including apprentices in our U.S. Apprenticeship Program, which was launched in 2015. This program includes multiple Texas locations.
- **STEM Ambassadors:** Dow formally launched the STEM Ambassadors program in 2014, deploying a group of trained Dow employees to inspire students and support teachers. These Dow Ambassadors work as teaching partners, conduct career talks and guest lectures, facilitate scientific research activities, and serve as mentors to students in over 40 sites in 24 countries. Under the Ambassador program, Dow also sponsors a bevy of after-school activities, including the FIRST Robotics teams, You Be the Chemist competitions, science fairs and skilled trade/career nights, and other competitions and events to elevate the importance of STEM among young adults. The program now consists of more than 2,200 Ambassadors around the world. Many of our employees in Texas serve as STEM Ambassadors, inspiring Texan students and partnering with teachers in many of the schools local to our Texas facilities.
- **Texas Girls in STEM 2018:** In the spring of 2018, Dow hosted its inaugural "Girls in STEM" Day at the Dow Academic Center on the campus of Brazosport College. The event was designed to introduce over 450 sixth grade girls from across Texas to the concept of STEM and expose them to the opportunities a career in STEM can unlock. The day included hands-on science, technology, engineering and math activities and conversations with female STEM professionals from Dow.
- **Mobile STEM Labs:** As a part of Dow's continued efforts to increase exposure to STEM among American youth, the company has launched mobile STEM labs throughout high schools across the state of Texas. In Texas City, a STEM lab was installed at Texas City High School. The supplies and equipment were made possible by a grant through the DowGives Community Grant Program. Additionally, the Calhoun County Independent School District (CCISD) unveiled its new Mobile Energy Resource Lab (MERL), a 22-foot trailer that has been transformed into a mobile classroom showcasing solar, wind, biofuels and other sustainable energy solutions. MERL will spend time at each CCISD campus, as well as other local community education events.
- **Dow-Jacobs Smithsonian Teacher Scholar Program:** Dow has partnered with Jacobs Engineering and the Smithsonian Science Education Center to deploy a program that trains 38 teachers from eight states through STEM education programs. The world-class professional development experience convenes these teachers in Washington, D.C. for the six-day Smithsonian Science Education Academies for Teachers (SSEATs), followed by a year of enrichment activities tailored to expanding science, technology, engineering, and math (STEM) excellence. Since 2007, Dow has supported over 310 teachers through its partnership with the Smithsonian Science Education Center.

Dow looks forward to continuing to work with Texas to build a better working future for students from all walks of life with interests in STEM fields.

# Regulatory Reform

## Environmental Regulation

In the U.S. today, manufacturing facilities are required to comply with a large amount of regulations. In many cases, these regulations are vital and have contributed significantly to making our nation's workplaces the safest and our environment among the cleanest in the world.

Smart regulations help ensure safe workplaces and a healthy environment while allowing manufacturers to grow and innovate. Regulations not grounded in science or lacking a convincing analysis of benefits versus costs are altogether different.

When regulations are overly burdensome and not based on the best available science, the impact on Texas' economy is immediate and significant. Costs to businesses mount quickly as they work to comply with permitting processes or new regulations.

Dow seeks a proper balance between regulation and the freedom to innovate. We believe that protection of human health and the environment is of utmost importance. This balance must maximize the effectiveness of both regulation and invention. We recognize that effective and smart regulations are vital to protecting our environments. At the same time, success in the marketplace provides companies the capacity to hire outstanding workers and invest in innovative solutions.

Of equal importance, regulations must not create ambiguity and uncertainty. They must also result in a clear and measureable environmental benefit. Therefore, regulations must provide flexibility for operations and reduce the burden of compliance, while continuing to protect all people and the environment.

### The Solution

As part of its long-standing commitment to environmental health and safety, Dow's number one priority is the health and safety of our employees, the communities where we operate, and the environment. Dow believes that well-conceived, science-based and effectively implemented regulations are important tools for protecting our employees, our communities, and the environment. Done right, these regulations also ensure American industry retains the capacity to operate and innovate, thereby bolstering the economy and the nation's workforce.

- Accelerate permitting actions for new growth and modifications to create the right growth atmosphere in Texas. Attracting new business growth and retaining existing business are highly dependent on the ability of state agencies to respond promptly and with certainty, in a fair and reasonable manner.
    - Specifically, the Legislature should remove the existing appropriation cap on the expedited permitting program at the Texas Commission on Environmental Quality (TCEQ). This will allow the agency to hire more contract workers or pay more overtime to review these critical permit applications. Unfortunately, participants in the expedited permitting program are currently paying to use the program, but there are no benefits associated with a permit being expedited.
- Ensure that regulations/statutes orient toward performance standards rather than prescriptive, rigid requirements, thereby allowing industry to be creative and develop the most efficient method of meeting the intent of the regulation.
- Agencies should work more collaboratively with industry in the regulatory development phase to ensure that better, more implementable standards are developed.
- Refrain from using guidance documents as regulatory tools. While some guidance documents are useful to understand the intent of a rule, they are often used as de facto rulemaking tools. This encourages regulatory bodies to exceed their statutory authority during enforcement activities, which has a net effect of creating regulatory uncertainty and adversely impacts willingness to invest in Texas. Regulatory agencies should refrain from basing enforcement activity on guidance documents.
- Enhance benefits to self-reporting and implementation of management systems. The majority of enforcement actions initiated by TCEQ are derived from self-reported data. This heavy handed approach can create a disincentive to self-report.

The Texas Emissions Reduction Plan (TERP) is an important component in the state demonstrating attainment with Federal air quality standards. Created by the Legislature in 2001, the state showed tremendous leadership in finding alternative solutions to reducing mobile air emissions, which lead the state in air pollution contribution. In order to ensure the most cost effective emissions reductions, it is critical that the Legislature continue the fee structure of TERP, which is set to expire in 2019.

## Water Policy

Water is critical to the viability of manufacturing in Texas. Dow is no different as our sites along the Texas Gulf Coast could be slated to grow, but water availability and reliability present real challenges.

According to the Texas Water Development Board (TWDB), Texas' population is expected to increase more than 70 percent by 2070, from 29.5 million to 51 million people. While the demand for water is projected to increase less significantly (approximately 17 percent between 2020 and 2070, from 18.4 million to 21.6 million acre-feet per year (afy)), Texas' existing water supplies are expected to decline by approximately 11 percent by 2070 (from 15.2 million to 13.6 million afy).

Water strategies such as conjunctive groundwater and surface water management are becoming increasingly more critical to the health of Texas streams and to maximizing available water in periods of drought. Exceptionally low river flows during dry months provide evidence that groundwater and surface water interactions are more significant than historically understood. During the drought of the 1950s, spring flows from shallow aquifers helped sustain surface water flows during the driest months in many watersheds. Today, it appears that ground water pumping from shallow aquifers near rivers depletes the daily available supply.

In as much as the potential over-pumping of groundwater is a threat, the strategic and purposeful use of groundwater is an opportunity. Groundwater represents the largest stored water reserve in the state, and in many deeper aquifer systems, groundwater storage is by comparison to surface reservoirs a drought resilient resource. Numerous opportunities exist to maximize both the availability and the reliability of the state water supply through thoughtful groundwater and surface water management. Groundwater related opportunities include strategies such as: Conjunctive Water Use (CWU), where surface water supplies are used in wet periods so there is more available groundwater for use in dry periods; Aquifer Storage and Recovery (ASR), where treated surface waters are proactively stored underground; and, Enhance Groundwater Recharge (EGR), where flooding or infiltration is encouraged in areas that are known to recharge groundwater. It is critically important that water law and local management practices strive to incorporate increased scientific understanding and that a more holistic approach aide in reshaping the often disconnected management practices and inconsistent patchwork of groundwater districts approach that exists today.

In addition to the specific recommendations below, the state of Texas should continue to encourage a broad range of solutions, including water conservation, coastal off-channel reservoirs, conjunctive groundwater use, aquifer storage and recovery, waste water re-use, and brackish and seawater desalination. Over time, it will become increasingly more important to allow market forces to aide in assuring that water resources are directed to the highest value uses. There is a definite need to encourage management practices and pricing strategies that reduce what is often an extreme cost delta between “old water” and “new water.”

Texas is faced with funding a multi-billion dollar water infrastructure plan. Finding effective ways to utilize every drop of water can help reduce the cost of the water plan, potentially saving the citizens of Texas millions of dollars.

**The Solutions:**

- Dow supports legislation that enables regulatory access to the state’s surface and groundwater resources. There are many areas of the state that are water rich. Similarly, there are areas of the state that are in need of water. The Legislature should incentivize – not restrict – the ability of water users to move water around the state, based on sound science.
- Watermaster programs are a very useful management approach on basins with substantial water rights and stress. In 2014, Dow was instrumental in creating a watermaster on the Brazos River. Dow continues to support the establishment of watermaster programs as the most efficient way to manage this critical resource. Implementation of water master programs are a low cost way to increase transparency, consistently follow established rule of law, increase the understanding of supply risks, increase the efficiency of supply management and encourage collaboration among basin water rights holders.
- The state needs to thoroughly study and appropriately account for conjunctive groundwater in the state’s water management. The over-pumping of shallow groundwater is not just a threat to groundwater supplies, it is a threat to the health of the state’s rivers and streams and the availability of surface water supplies.

As a result of population growth, Texas will need additional water supply or water savings through conservation to meet its demand for water in 2070, according to the 2017 State Water Plan. Dow core values include the belief that conservation is a critical and key component to both short and long terms solutions to global and regional water concerns. Dow has employed a broad range of water conservation measures at our facilities. These solutions have varied by situation and location but include reduced use, reuse, more water efficient approaches to process cooling and process recycles. In several locations, we utilized direct recycle of municipal wastewater to supplement site water supplies. This approach was most recently employed in response to drought conditions in Texas at our Freeport Site. The state should encourage responsible use of this valuable natural resource. To read more about Dow’s water sustainability goals, check out https://corporate.dow.com/en-us/science-and-sustainability/2025-goals.

# Tax Policy

## Overview

Tax policy impacts business investment, economic growth, and job creation in Texas. Dow supports a tax policy that is fair and equitable, broad-based, and does not impede job creation and investment. Unfortunately, Texas does not have that kind of tax policy in place today. Texas businesses pay over 60 percent of the total taxes in the state, according to the Council on State Taxation. This is significantly higher than the national average of just under 44 percent.

With a gross domestic product of $1.7 trillion, Texas is the 2nd largest economy in the U.S. and the 10th largest in the world. However, despite manufacturing being a large part of the Texas economy, the state's uncompetitive tax structure is among the most pressing challenges in the state.

To aggressively compete for even more manufacturing jobs and solidify Texas's place as the number one place for business, the state must take concrete steps if it is going to continue to lead the nation in policies that attract investment, spur innovation, and create a more prosperous Texas for generations to come.

Although Texas ranks as one of the best overall places to do business, it ranks just 13th overall in the Tax Foundation's 2018 State Business Tax Climate Index, and the state ranks near the bottom in specific business tax provisions that are important to manufacturers.

### Property Tax

The property tax burden in Texas, for personal property as well as industrial property, is among the highest of any state in the country. The effective rate on industrial plants ranks 4th highest nationally and the base is generally broader than almost every other state. Texas taxes all real estate plus any tangible personal property used for business purposes, which includes equipment and inventory. For comparison, 11 states exempt business tangible personal property and only 10 states broadly tax inventories. Dow supports broad-based and balanced property tax relief that will attract new investment and spur additional economic growth.

Texas state and local taxes on business are 8 percent higher than the average state. That makes Texas a relatively high tax state for business – ranking 16th highest in the country. *Source: Texas Taxpayers and Research Association*

To illustrate how the Texas property tax burden is uncompetitive, consider this: an industrial facility valued at $1 billion would pay over $630 million in state and local property taxes if it did not receive any local tax abatements, according to the Texas Taxpayers and Research Association. The national average for an investment of this size is less than $400 million, putting the Texas property tax burden on a project of this size at 65 percent higher than the national average.

*Preserving Property Tax Abatement Authority*

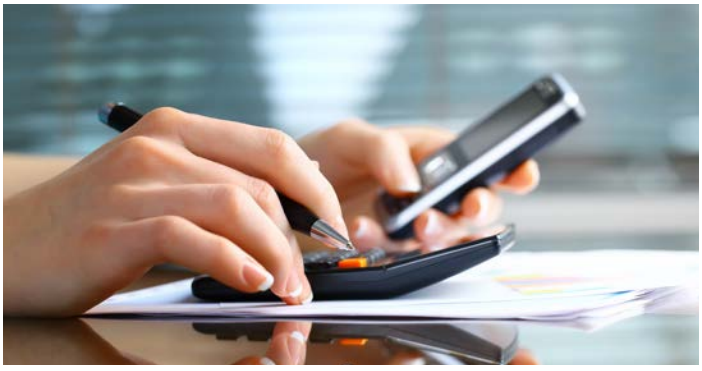
Chapter 312 of the Texas Tax Code, which gives authority for cities and counties to temporarily abate property taxes for manufacturing and other projects, will expire on September 1, 2019, unless the Legislature extends it. This is one of the most powerful tools in the state's economic development toolbox that must be preserved since Texas has some of the highest property taxes in the country and nearly all other states offer similar abatements. Chapter 313 abatements, which provide a similar authority for school districts to limit property taxes for economic development, will not expire until 2022, but both are key to attracting manufacturing investment. As a result of a 3-4× multiplier effect, manufacturing investment is a key to success for many Texas communities. In order for Texas to remain competitive with other states for major investment projects, it must preserve its property tax abatement authorities.

### Inventory Tax Reform

In addition to being one of remaining states to tax tangible business property as part of its property tax assessments, Texas is one of 10 states broadly levying a tax on most business inventories. Inventory generally includes the value or raw material inputs, finished manufactured goods, and the supplies and parts that manufacturers like Dow need to operate our business. This is a major impediment to attracting even more capital investment to Texas because many of the advanced manufacturing projects Texas is competing for require expensive, high-tech equipment. The inventory tax also forces many manufacturers to store materials outside of the state. We believe Texas should consider exempting equipment used directly in manufacturing processes, or going a step further and exempting all business inventories.

### The Solutions:

- Extend the Chapter 312 Property Tax Abatement authority for cities and counties, and consider proactively extending the Chapter 313 tax abatement authority for school districts.
- Exempt equipment and materials used directly in the manufacturing process from the inventory tax, or go a step further and exempt all business inventories.
- Pursue broad-based and balanced property tax relief that will attract new investment and spur additional economic growth.



**The Dow Chemical Company**
2211 HH Dow Way
Midland, MI 48674

**U.S., Canada and Mexico**
Toll Free 800 447 4369
*Toll-free service not available in all countries

**dow.com**