



2019 INTEGRATED RESOURCE PLAN SUMMARY

# Clean, Reliable Solutions to Power Michigan's Future



# Introduction


Michigan is in the midst of an energy transformation. We are reimagining and restructuring how we power our homes, our businesses and our vehicles.

The drivers of that transformation – a desire for safe, clean, affordable and reliable power; an aging power infrastructure; and the need to minimize our impact on the environment – each require thoughtful consideration and balance.

At DTE Energy – a Michigan-based company serving 2.2 million electric customers and 1.3 million gas customers – we have been at the forefront of successfully striking that balance. In 2017, DTE announced plans to reduce our carbon emissions by more than 80 percent by 2050, making it one of the most aggressive plans in the country. And last year, we committed to producing 50 percent of our energy from clean sources by 2030. This clean energy commitment includes a minimum of 25 percent renewables and at least a 1.5 percent improvement in energy efficiency each year.

With this integrated resource plan, we're going even further – a lot further. **We're moving up our carbon-emissions goal by a full decade, pledging to reduce emissions by 80 percent by 2040. And in the near term, we have committed to a 50 percent carbon emissions reduction by 2030<sup>1</sup>.** And we're doing so in a way that ensures our energy sources remain reliable and the power they produce affordable.

1. Compared to 2005 baseline; CO<sub>2</sub> emissions associated with energy generated for DTE Electric customers.



“Not only is our 80% carbon reduction goal achievable – it is achievable in a way that keeps Michigan’s power affordable and reliable. There doesn’t have to be a choice between the health of our environment or the health of our economy; we can achieve both.”

**Gerry Anderson**, chairman and CEO, DTE Energy



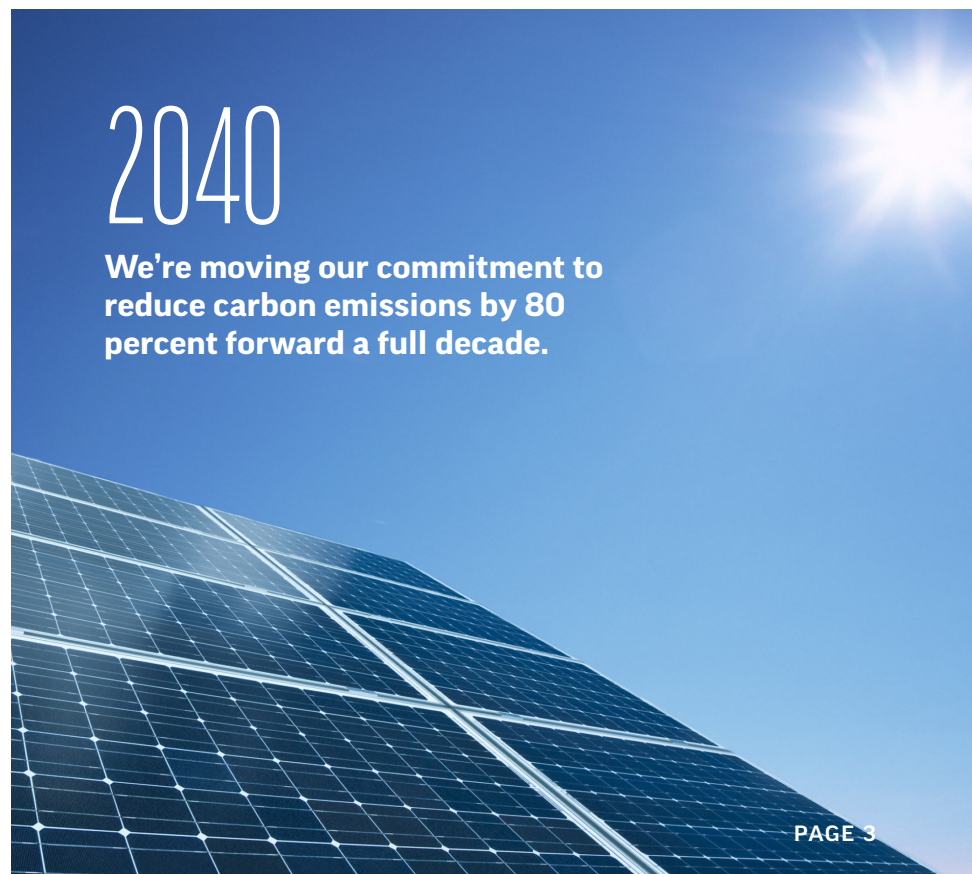


In order to achieve our bold new goal, we're expanding our energy-efficiency programs to reduce even more consumption and help our customers - especially our low-income customers - save energy and money. And we've expanded our voluntary renewables program, MIGreenPower, to our large business and industrial customers, which will accelerate our state's transition to renewable energy and empower companies to meet their sustainability goals through voluntary investments.

We're also moving our previously announced closures of the Trenton Channel Power Plant and the final generation unit at St. Clair Power Plant up one year, to 2022.

We're committed to our communities - to creating jobs for the people who live in them and to providing a balanced mix of safe, clean, reliable and affordable energy. In fact, reducing carbon is the greatest opportunity we have as an energy company. And we're already doing it - by building the clean energy sources that our customers are asking us to build.

This integrated resource plan (IRP), submitted to the Michigan Public Service Commission, lays out our vision for ensuring Michigan continues to lead in creating clean, reliable, affordable, home-grown energy that its residents and businesses can depend on. It provides both a high-level and detail-rich strategy for powering Michigan's homes and businesses over the next five years, as well as a flexible long-term plan that can evolve as our technological options and the needs of our state evolve.



# 2040

**We're moving our commitment to reduce carbon emissions by 80 percent forward a full decade.**

# More Clean Energy, Less Coal

Climate change is one of the defining public policy issues of our time. At DTE, we are passionate about being central to the solution. That's why we have set ambitious new goals of reducing carbon emissions by 80 percent by 2040 and 50 percent by 2030. Those goals align with the target scientists have identified as necessary to help address climate change, and we will achieve them through aggressive investment in energy efficiency, renewables, the Blue Water Energy Center and our voluntary renewables programs, as well as through earlier coal retirements.

## Coal Plant Retirements

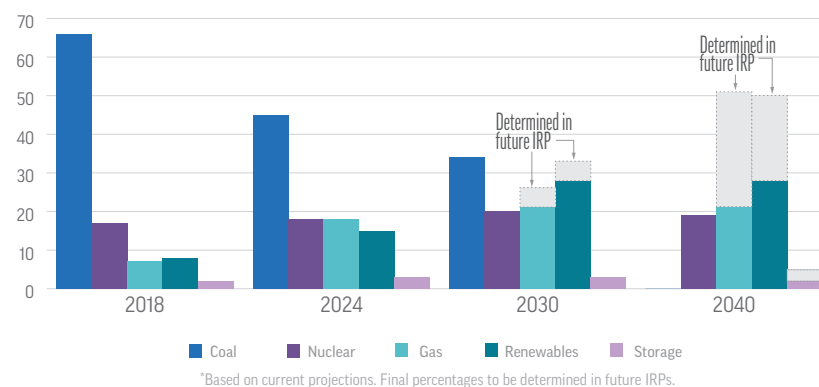
In 2016, DTE announced the retirements by 2023 of three aging power plants – River Rouge, St. Clair and Trenton Channel– that account for nearly 20 percent of our total generation. Those retirements follow the closure of two other plants – Marysville and Harbor Beach – between 2011 and 2013, and generation units at our St. Clair, Trenton Channel and River Rouge plants between 2011 and 2017.

We're now planning to close our Trenton Channel Power Plant and St. Clair Power Plant in 2022 – one year earlier than we originally intended.<sup>1</sup> We want to move forward as quickly as possible to achieve our carbon-reduction goal, and need to do it in a way that balances the reliability of the energy grid while also working closely with the impacted communities and employees during this transition.

<sup>1</sup> contingent on resolution of grid reliability concerns



2018-2040 Generation Mix Percentage



Our coal plants have served our communities and employees well for nearly 75 years. We're proud of that legacy of service and will continue to build upon it for generations to come. We are working closely with municipal leaders in River Rouge, Trenton and St. Clair County to find meaningful ways to turn the coal plant properties into viable economic contributors after our facilities close. We are collaborating with union leadership on developing retraining programs and an employee transition strategy that is committed to no layoffs while maintaining affordable and reliable 24/7 power for our customers.





### Building Renewables

DTE is Michigan's largest renewable-energy provider. By 2024, we will more than double our renewable energy, generating enough clean energy to power 800,000 Michigan homes. By the time we remove all coal from our generation fleet in 2040, our renewable-energy portfolio will have quadrupled.

Since 2009, we've driven investments of \$2.8 billion in renewable energy – a figure that will increase to \$4.8 billion by 2024. The vast majority of that investment is supporting Michigan communities and creating Michigan jobs.



4,000

Michigan jobs created



2040

Our renewable energy  
will quadruple by 2040



11.5 M

11.5 million solar  
panels by 2040

## DTE's Renewables Mix Today



Solar



Wind

DTE currently operates more than 30 solar parks in Michigan, with plans to increase solar capacity by 25 percent over the next five years. In 2017, DTE commissioned the O'Shea Solar Park in Detroit, repurposing 10 acres of previously vacant land, and the Lapeer Solar Park, the largest universal solar park in the state. The Lapeer site includes 200,000 solar panels, making it one of the largest solar parks east of the Mississippi, and its arrays produce enough clean energy to power 11,000 homes.

31

31 solar  
parks in  
Michigan

200K

200,000  
solar panels  
in Lapeer

11K

11,000  
homes can be  
powered by  
the Lapeer  
Solar Park

Wind is currently our lowest-cost and most abundant renewable resource, which is why we've already invested in the building of 14 wind parks. In early 2019, DTE commissioned Pine River, its largest operating wind park to date. Its 65 turbines generate enough energy to power more than 54,000 homes. Pine River will offset nearly 300,000 metric tons of CO<sub>2</sub> annually – the greenhouse-gas equivalent of taking more than 63,000 cars off the road. In early 2020, we'll commission an additional wind park that will be even larger than Pine River.

14

We've  
invested  
in 14 wind  
parks

300K

Pine River  
will offset  
nearly  
300,000  
metric tons of  
CO<sub>2</sub> annually

2020

In 2020 we'll  
commission  
an additional  
wind park



## Partnering with Michigan Residents, Business and Industry

We're proud of our investment in renewables, of DTE's leadership in this critically important area and of the fact that we align with scientific consensus about the steps needed to protect our planet. And we're determined to go further.

Combating climate change must be a cross-industry effort, so we've expanded our MIGreenPower program to our large business and industrial customers. Introduced in 2017, MIGreenPower is a voluntary renewable energy program that provides DTE's residential and business customers with an easy and affordable way to reduce their carbon footprint by increasing the percentage of their energy use attributable to local wind and solar energy sources, up to 100 percent. Participating customers – who now number more than 5,000 – see a slight increase in their monthly bill while knowing they're helping to support Michigan's clean energy future.

We're expanding this voluntary initiative to meet the needs of our largest business and industrial customers who are working to meet their own sustainability goals, enabling them to invest in renewable energy, which will help drive our state toward an even cleaner future. The program is designed to grow and represents a progressive approach to fill market demand. In fact, we've already partnered with Ford and GM to provide renewable energy to support their sustainability goals.

Ford has committed to procuring 500,000 MW hours annually of wind energy to power several of its Michigan facilities, including the plant that makes its popular F-150 truck. GM has partnered with DTE to procure 300,000 MW hours annually of wind energy to power its technical center in Warren, Mich., and its headquarters in Detroit.

DTE also is exploring opportunities to expand its residential offerings to those interested in more local, community renewable energy.

## Improving Energy Efficiency

Energy efficiency works hand-in-hand with renewable energy sources to ensure we meet our clean energy goals. In short, when homes and businesses reduce their energy use, we can generate less electricity, benefiting both customers' pocketbooks and the environment.

DTE previously committed to increasing energy efficiency at a level equivalent to 1.5 percent of sales annually. Our efforts already have resulted in nearly 700 MW annually of reduced energy demand since 2009, equivalent to the energy produced by one large power plant. Improving energy efficiency also results in lower bills for customers; for every dollar invested in energy efficiency, customers save \$5.

With this plan, we're building on the success of these efforts by committing to a 1.75 percent annual improvement in energy efficiency – 75 percent more than the level required by law. Improving energy efficiency will reduce our carbon emissions even further – meaning we need to generate even less energy. The expansion of those programs also will mean more jobs and business for the Michigan firms that support them.

DTE also is a leader in demand response, rewarding residential and business customers who reduce or shift electricity usage during peak periods. We offer our customers the opportunity to reduce their energy use and lower their bills through multiple programs. Our demand-response program is in the top 25 percent nationwide and is the largest in Michigan, with more than 700 MW of program capacity.

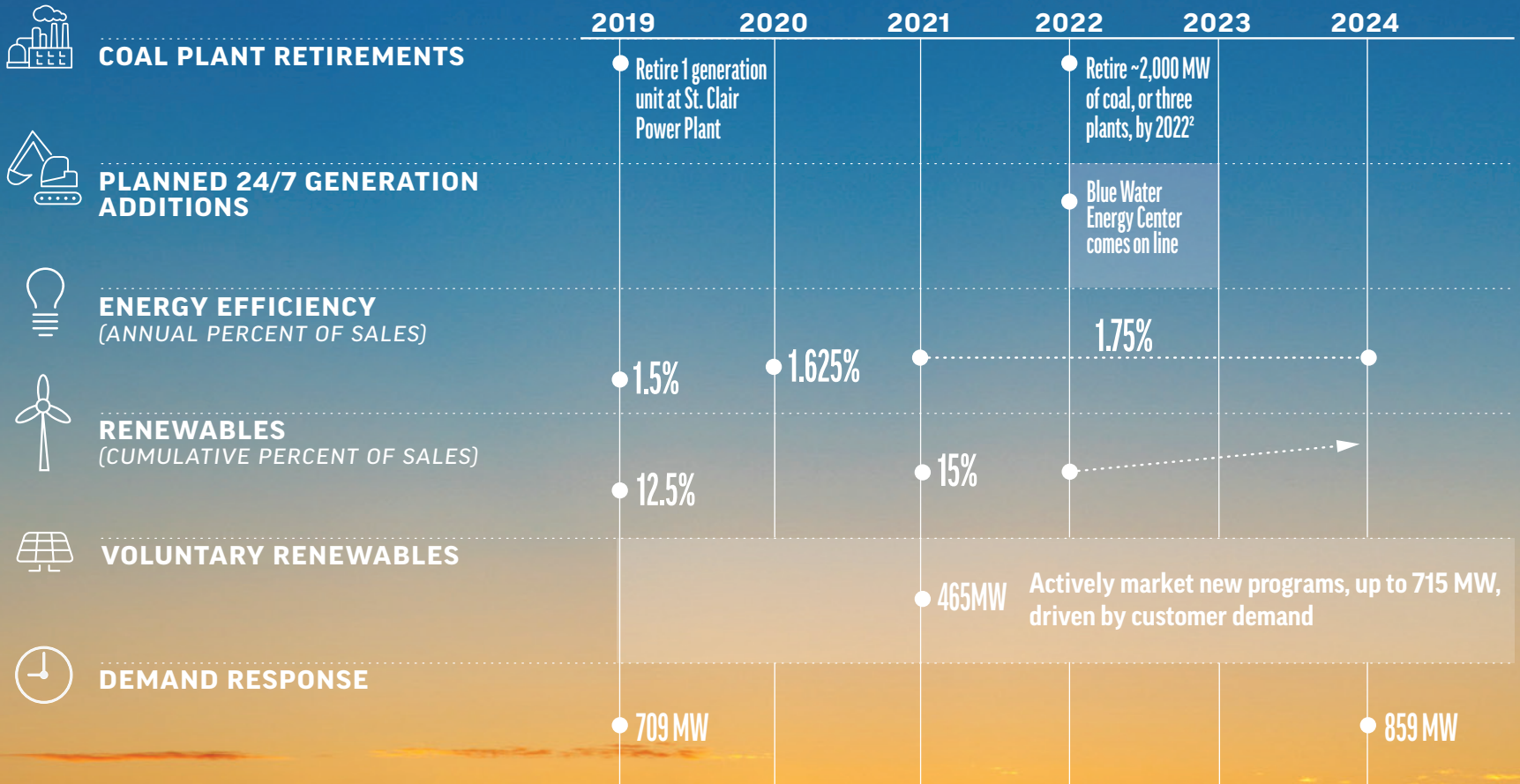


# Powering Michigan's Future

The plan we are submitting focuses on the next five years and considers the most affordable and reliable mix of generation sources that are available today. However, these technologies are improving rapidly, so we also have created a flexible long-term plan that allows us to review technological advancements as they become feasible and affordable. We've developed four alternate long-term options, modeling different costs and technology assumptions for each. We will continue to revisit and refine our plan as technology develops, customer desires and trends become more clear, and costs decline.

## The Defined Short Term: 2019-2024

**CARBON REDUCTION TARGET = 32%<sup>1</sup>**





## The Flexible Future: 2025-2030

**CARBON REDUCTION TARGET = 50%<sup>1</sup>**



**Retire Belle River Power Plant by 2030**



**Increase renewables to at least 25%**



**Continue 1.75% energy efficiency and review biannually**



**Maintain or increase demand response**



**Continue to market and add voluntary renewables based on customer demand**

### Possible pathways that could meet future generation needs:

**A**

Achieve 1,390 MW of voluntary renewables

Increase demand response

Maintain 1.75% energy efficiency

**B**

Achieve 1,390 MW of voluntary renewables

Construct new natural gas-fueled power plant

Maintain 1.75% energy efficiency

**C**

Achieve 465 MW of voluntary renewables

Increase demand response

Increase energy efficiency to 2.00% in 2026

**D**

Achieve 465 MW of voluntary renewables

Construct new natural gas-fueled power plant

Maintain 1.75% energy efficiency

## The Flexible Future: 2031-2040

**CARBON REDUCTION TARGET = 80%<sup>1</sup>**



**Retire Monroe Power Plant by 2040**



**Increase renewables, energy efficiency and demand response consistent with carbon reduction goals**

There are multiple pathways to meet carbon goals and generation needs in 2030 and beyond; we will remain flexible and present potential future options in our next IRP.

1. Compared to 2005 baseline; CO<sub>2</sub> emissions associated with energy generated for DTE Electric customers  
2. Retirements of St. Clair, River Rouge and Trenton Channel plants are contingent on the successful start up of Blue Water Energy Center and resolution of grid reliability concerns

# Balanced, Reliable, Customer-Focused

As we embrace renewable energy, our IRP provides a clear and balanced path for meeting our carbon-reduction goals while ensuring energy remains affordable and reliable.

Michigan's unique peninsular geography and the physical limitations of the transmission system mean that 95 percent of Michigan's power generation must be physically located in the Lower Peninsula to meet regional capacity reliability standards. So while some power can be imported from out of state, the vast majority must be locally produced in order to maintain a reliable energy grid.

Even as three coal plants are going away, the demand for around-the-clock electricity is not. And since the weather and the economy are both prone to change, we need a flexible, nimble mix of energy sources that can meet our customers' changing needs, 24 hours a day, seven days a week. Because renewable energy is variable, the need to carefully plan for and balance local supply for every hour of the year is absolutely critical. We cannot rely on purchasing energy on the market when demand is high – if every energy company in our region did that, reliability would be undermined. That's why we're pushing hard to both meet our ambitious clean-energy goals and to ensure our regional energy grid remains reliable.

Key to balancing these commitments are the Blue Water Energy Center and the Ludington Pumped Storage Power Plant.







## Blue Water Energy Center

Natural gas will help us make the transition to renewables in a way that provides the reliability Michigan residents need, while significantly reducing our carbon footprint. Natural gas plants are a highly efficient, low-emission energy source that provide reliable, on-demand, 24/7 electricity.

The Blue Water Energy Center (BWEC), approved by the Michigan Public Service Commission in 2018, will be a state-of-the-art, natural gas combined-cycle plant and one of the most efficient plants in the United States. It will replace three retiring coal plants, allowing Michigan to have both a sharp reduction in carbon emissions and an always-available energy source, helping us create a cleaner energy future. It will be capable of ramping up quickly to accommodate changes in demand and fluctuations in renewables and other energy sources, ensuring our state's homes and businesses have a reliable power source and giving them peace of mind.

This plant will provide enough 24/7, affordable and reliable energy to power 850,000 homes beginning in 2022. BWEC will reduce CO<sub>2</sub> emissions by 70 percent compared with the three coal plants it is replacing. It also will reduce sulfur dioxide (SO<sub>2</sub>), and nitrous oxide (NO<sub>x</sub>) emissions by more than 95 percent compared with the coal plants slated for retirement, while supporting Michigan's manufacturing operations and residential customers. The plant represents a nearly \$1 billion investment in Michigan. Construction jobs will peak at about 520 full-time positions during construction and will provide about 35 full-time positions once the plant is in operation.

850K

**In 2022 BWEC will  
provide enough  
energy to power  
850,000 homes**

## Ludington Pumped Storage Power Plant

The Ludington Pumped Storage Power Plant, which DTE co-owns with Consumers Energy, is located on a 1,000-acre site on Lake Michigan in Mason County. The plant generates hydroelectric power and supports our renewables generation because it acts like a giant battery that can be tapped when renewable output drops.

The Ludington plant consists of a man-made reservoir located above six 300-ton turbines. The reversible turbines work as pumps when energy is plentiful and low-cost, such as when the sun is shining and the wind is blowing, and as power generators when demand is higher and renewable sources less abundant. The plant pumps water from Lake Michigan uphill to the 27 billion-gallon reservoir at low-demand times, and releases the stored water downhill through the turbines to generate electricity when energy demand is higher.

Ludington can ramp up to peak output in just 30 minutes. It provides a sustainable, clean, reliable energy source that quickly responds to the daily, weekly and seasonal highs and lows of Michigan's energy demand. It also helps keep energy bills lower because it allows DTE to avoid having to buy expensive out-of-state electricity when demand peaks.

An \$800 million upgrade project to replace each of the six turbines is on schedule to be completed in 2020. Ludington, the second-largest pumped storage facility in the United States, will then support power for 175,000 DTE households.



\$800M

**An \$800 million  
upgrade project to  
replace each of the six  
turbines is on schedule  
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2020**





# A Collaborative Vision: Stakeholder Input

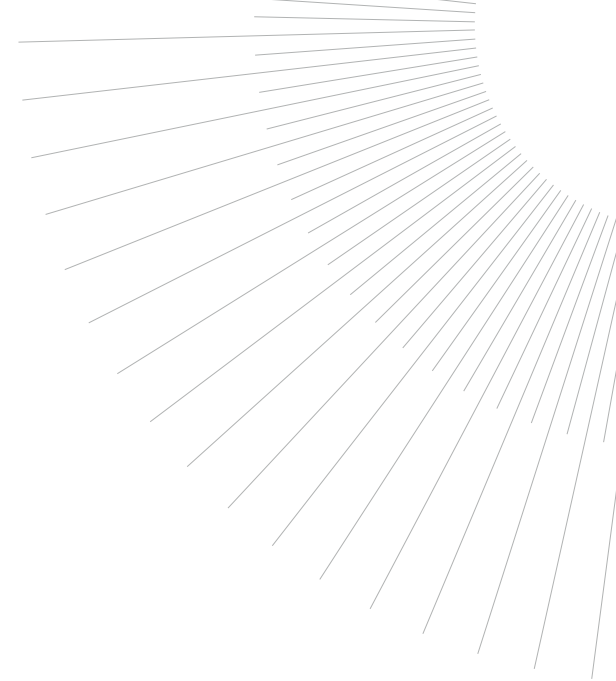
We must work together collaboratively to secure Michigan's energy future. DTE spent months seeking input on this IRP from members of the public, consumer and environmental advocates, and other stakeholders at numerous forums and open houses across the state.

We believe everyone benefits from the exchange of information and open dialogue, and so we worked to implement a comprehensive, transparent and participatory stakeholder engagement process. Outreach was designed to create awareness of the IRP process, encourage honest communication, and obtain and incorporate feedback. We hosted four technical workshops and three public open houses, and created a DTE IRP email account for electronic comment submission and response.

Registration for the open houses was not required, and we publicized them through social media, the DTE newsroom, emails to stakeholders and through our blog, [EmpoweringMichigan.com](http://EmpoweringMichigan.com). We also included open house content on the site for easy access.







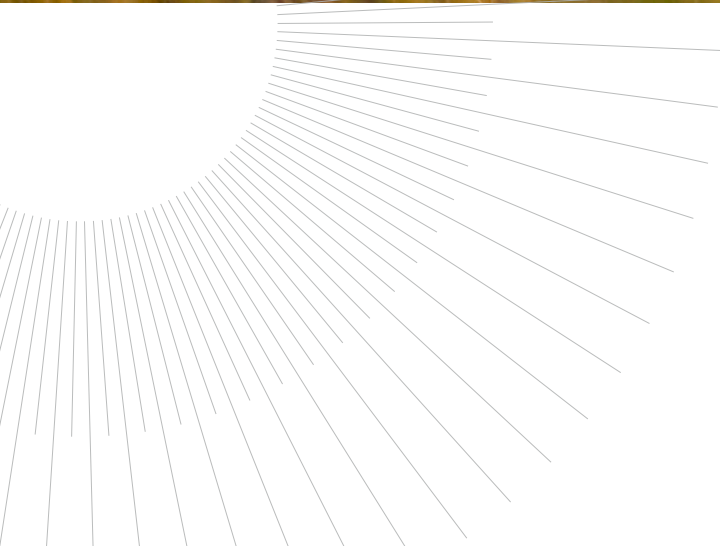
At each technical meeting and open house, we worked to understand and respond to stakeholder suggestions and concerns. Here's what we heard at those meetings:

- Michiganders want their power sources to be safe, affordable and reliable.
- They care about climate issues and want to make sure we're doing everything we can to transition to cleaner energy, including renewable energy, energy efficiency and demand response.
- They want more information on how to engage with DTE on everything from energy-efficiency audits to tree trimming.

DTE has listened carefully to that input. We are confident this IRP incorporates the needs and concerns of Michigan residents and businesses and provides a safe, affordable, reliable and effective course of action.

We appreciate the participation and feedback that was provided and engagement from our technical and public stakeholders. We will continue to communicate with our stakeholders as part of our commitment to engagement.





**DTE**

For more information visit: [www.journeyto80.com](http://www.journeyto80.com)