



**CleanVision Plan**

**Second Public Open House**

February 22, 2022

**Visit Our Website:** [dtecleanenergy.com](https://dtecleanenergy.com)

**Email us at anytime:** [DTE\\_Electric\\_CleanVision@dteenergy.com](mailto:DTE_Electric_CleanVision@dteenergy.com)

# Meeting logistics

- Today's live presentation will be followed by Q&A
- Live closed captioning is available
- The DTE overview presentation will be followed by details on how to provide comments on the CleanVision Plan
- This presentation is available on the website [dtecleanenergy.com](https://dtecleanenergy.com)
- Questions or comments can be submitted anytime during this event by using the "Q&A" function in the top right-hand side of your screen
  - We will queue up audience questions and comments after the initial presentation
  - Please include your name in the question/comment
- Additional opportunities for public input will be available in the remaining two open house sessions and through the comment section on the website
- The presentations, transcripts and recordings for all public meetings will be posted to [dtecleanenergy.com](https://dtecleanenergy.com)
- If you are having technical difficulty, please contact DTE\_Electric\_CleanVision@dteenergy.com ([link](#))

You may find recordings, transcripts, and the presentation from the first CleanVision Plan Open House on our website

[DTE Energy - Net Zero Carbon Emissions by 2050 \(dtecleanenergy.com\)](https://www.dtecleanenergy.com)

Home Reducing Emissions Our Habitat Did You Know? CleanVision Plan Join Us

# DTE CleanVision Integrated Resource Plan

DTE Electric's CleanVision Plan is our journey to achieve net-zero carbon emissions for the Electric Company by 2050 while providing clean, reliable, and affordable energy to our customers. In October 2021, DTE Electric announced plans to accelerate our interim goal of 50% carbon emissions reductions, achieving that goal by 2028. We will further outline our goals to provide cleaner, reliable, and affordable energy in our next Integrated Resource Plan (IRP) filing with the Michigan Public Service Commission (MPSC).

Come back here for more information in February about the next Open House to be held on February 22, 2022, at **1 p.m.** and **6 p.m.**

## FAQ

[SEE ALL FAQs >](#)

### What is an integrated resource plan?

An Integrated Resource Plan (IRP) is a comprehensive plan to meet electricity needs of our customers 5, 10, and 15 years into the...

[READ MORE](#)

### Is there a way for me to engage with DTE in the CleanVision Plan Process?

Yes! Public input is an important part of the IRP process. DTE will be hosting four public open houses in the first half of this year. In or...

[READ MORE](#)

### Will you be having more public open houses? If so, when?

## Open House

January 18, 2022 at 1pm ET

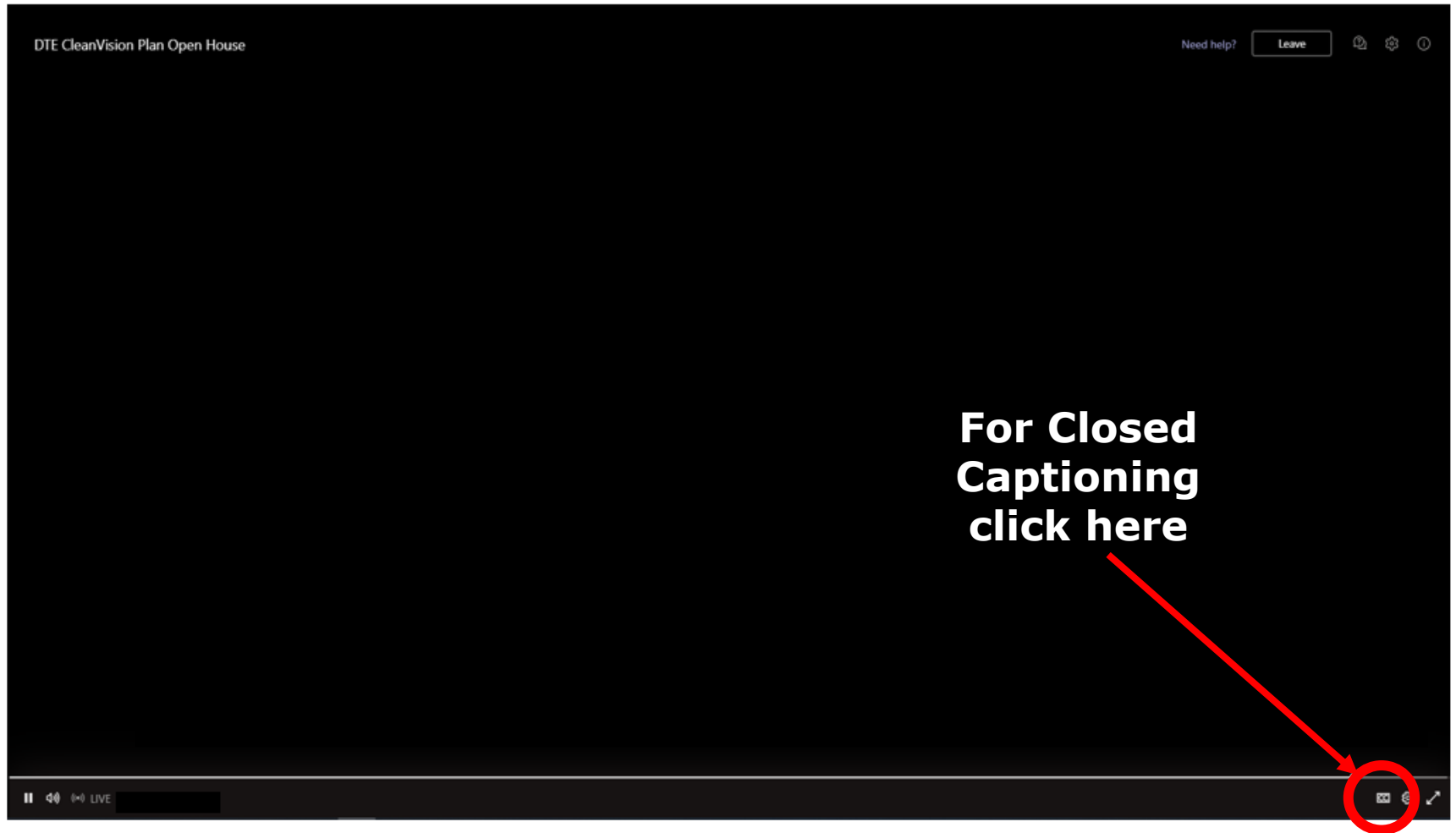
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January 18, 2022 at 6pm ET

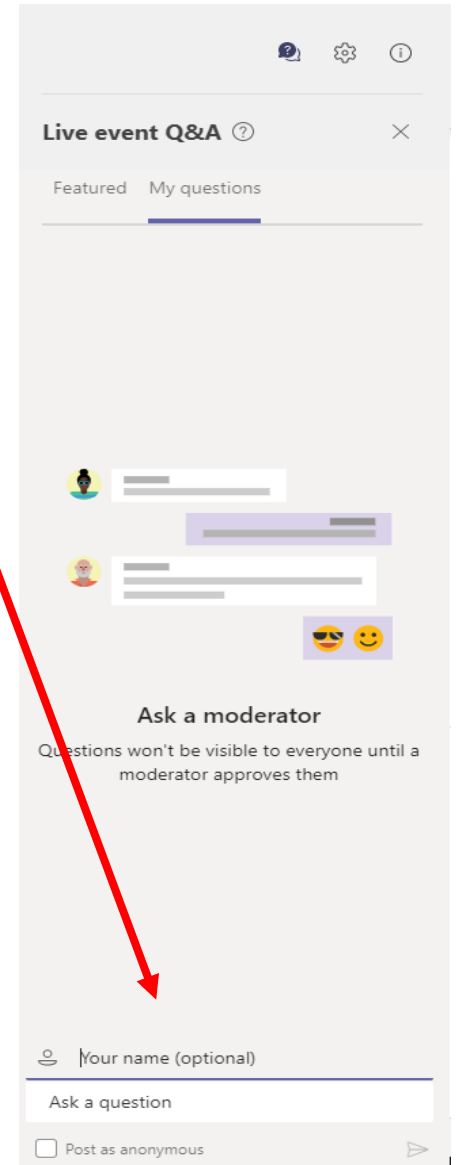
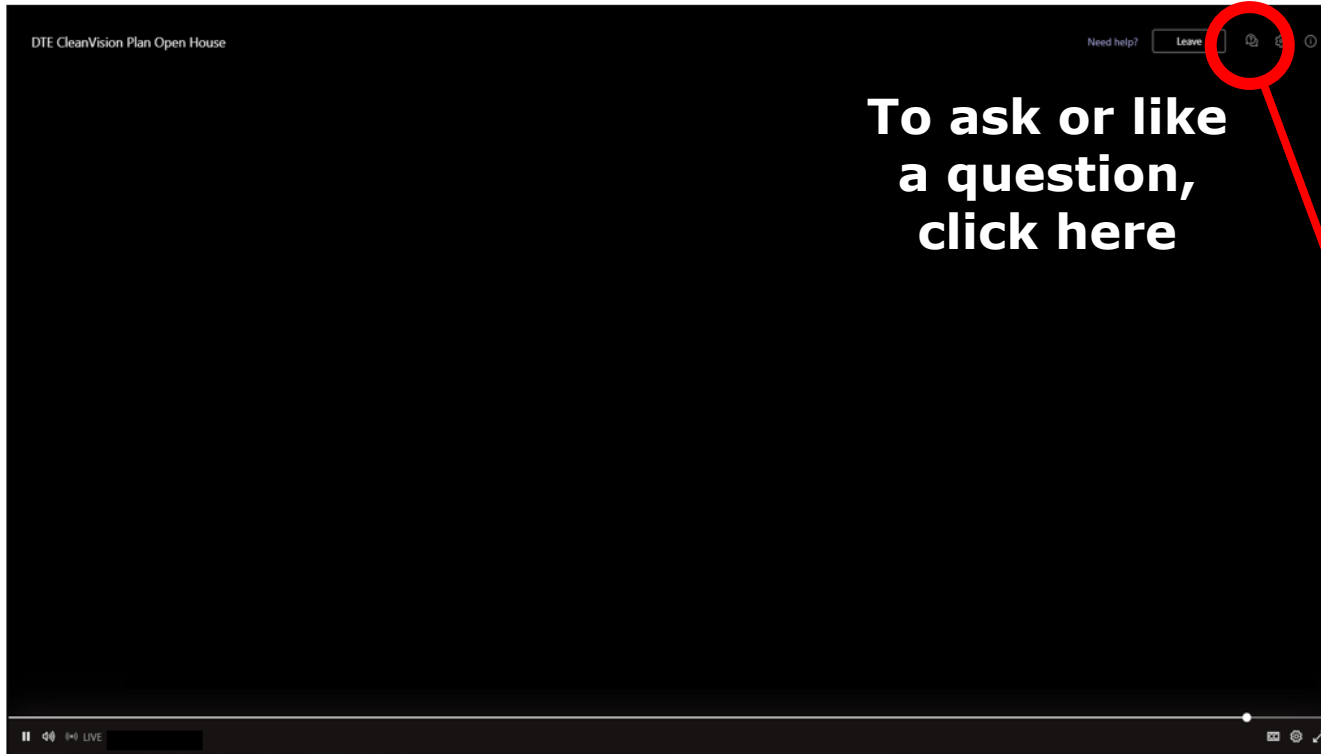
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Recording and transcript

# Helpful Tips: Closed Captioning



# Helpful Tips: Submitting a Question



# Agenda and Upcoming Dates

## **Public Open House #2: February 22, 2022**

### **Today's agenda**

- Introduction
- Renewable Overview
- Introduction to Emerging Technologies
- Q&A

## **Save the Date: Upcoming Open House Dates**

#3: March 22

#4: April 19

**Please check our website for updates and  
upcoming meeting logistics:**

[dtecleanenergy.com](http://dtecleanenergy.com)

# Introductions



**Joyce Leslie**  
**Director, Business**  
**Planning &**  
**Development**  
**DTE**



**Laura Mikulan**  
**Manager, Integrated**  
**Resource Planning**  
**DTE**



**Jason Rowell**  
**Associate Vice**  
**President and**  
**Director**  
**Black and Veatch**

**Vielka Hernandez**  
**Manager,**  
**Renewable Energy**  
**Strategy**  
**DTE**







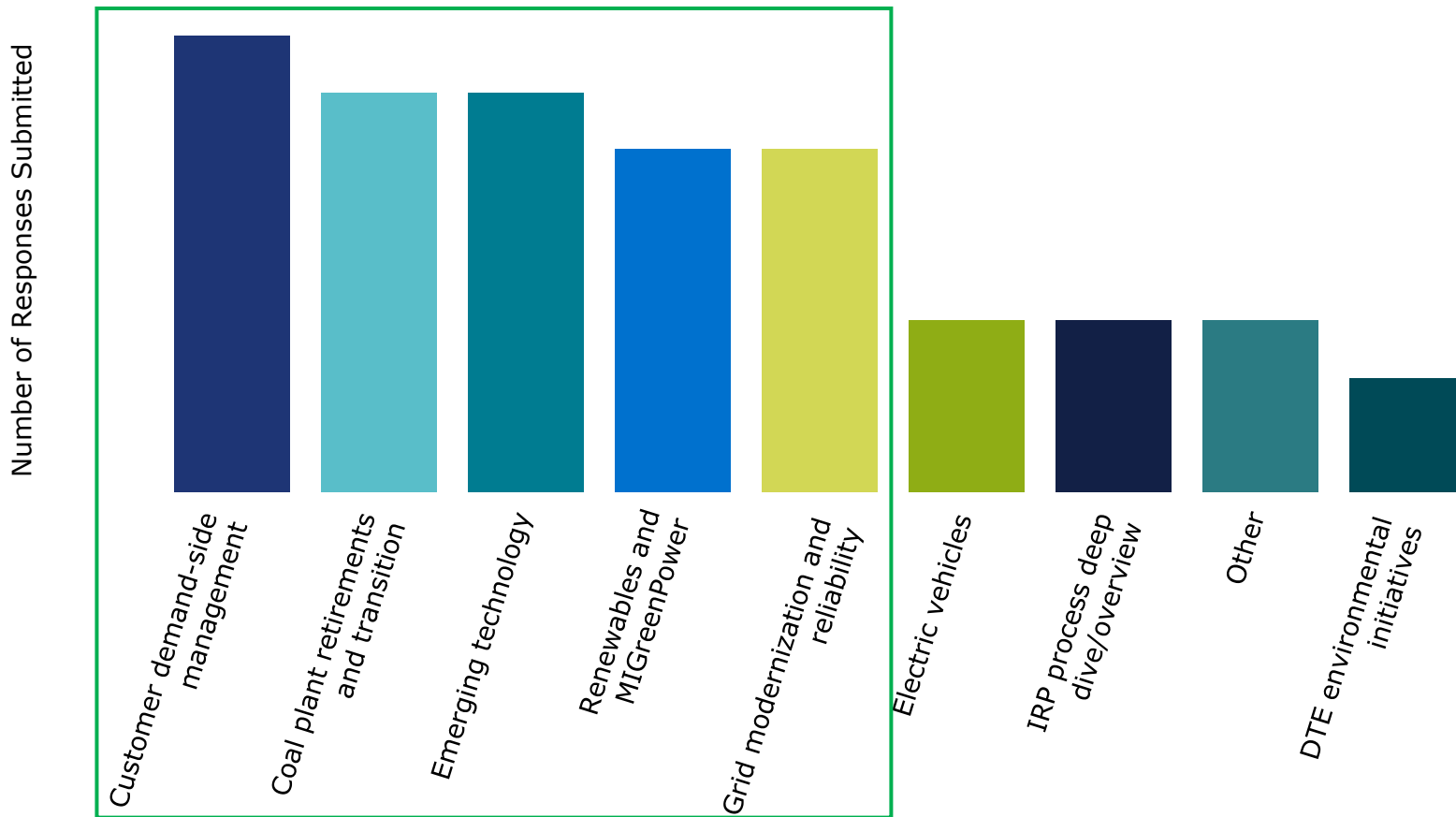
# What is an Integrated Resource Plan (IRP)?



- **An IRP is a comprehensive plan to meet electricity needs of a power company's customers 5, 10, and 15 years into the future**
- **An IRP details the planned resources that a power company will use to deliver reliable, affordable electric supply to its customers**
- **Electric utility IRP filings are required by the State of Michigan**

We want to thank you for your feedback during the first public open house meeting; survey results helped shape today's agenda, as well as the agendas for March 22 and April 19

**What are areas of interest relative to the CleanVision Plan that you would like to engage in at future Public Open House meetings?**



Today's discussion will focus on renewable energy and emerging technologies

## Renewable Energy Overview



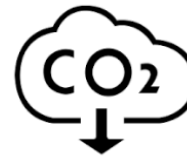
## Introduction to Emerging Technologies



Energy Storage



Hydrogen (H<sub>2</sub>)



Carbon Capture and Sequestration (CCS)



Small Modular Nuclear (SMR)

DTE continues to be Michigan's largest investor in renewable energy as well as the state's largest producer of clean power

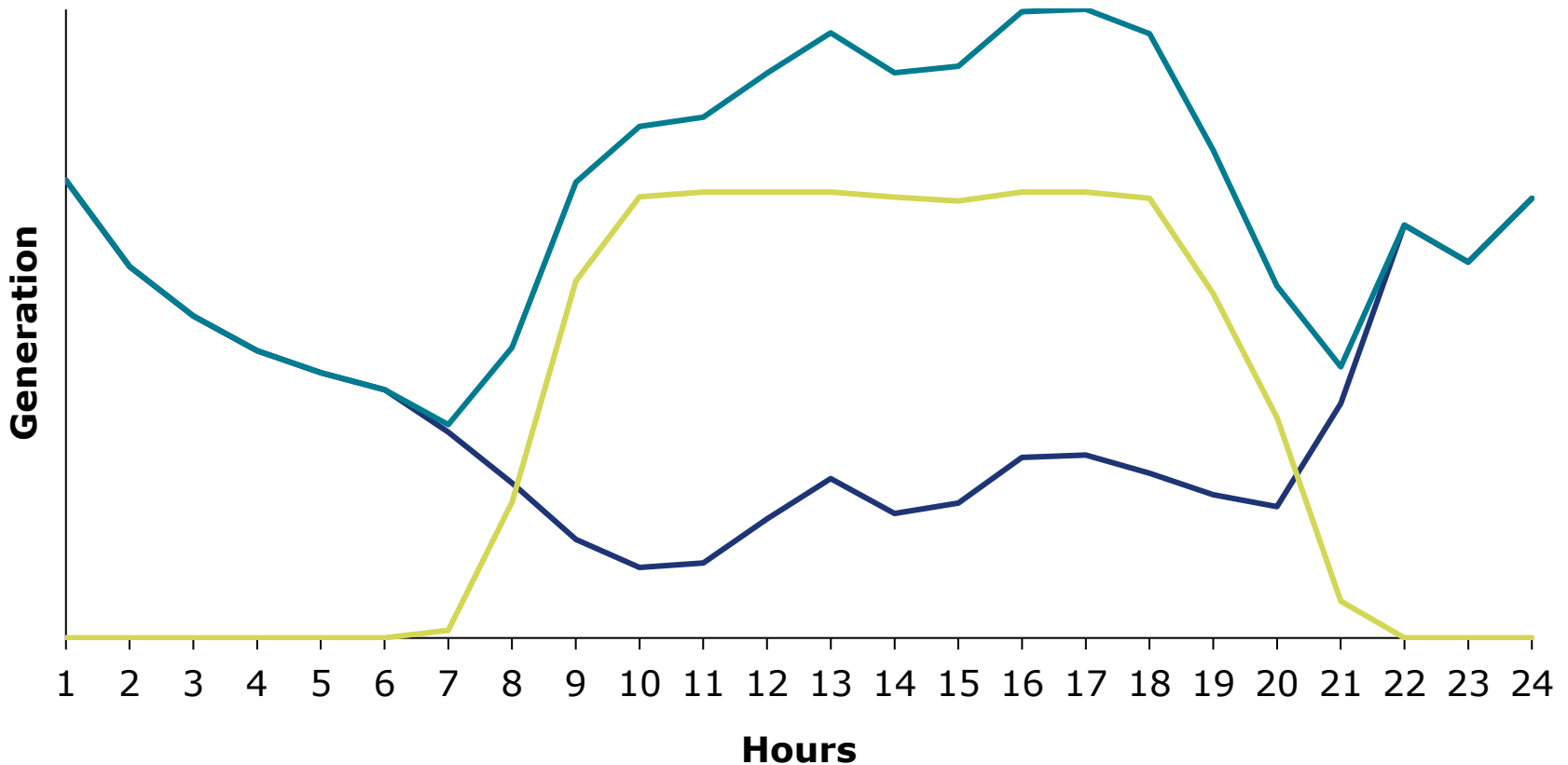


- Renewable Energy is power we generate from replenishable resources. The majority of DTE's renewable energy fleet is wind, but going forward, we will be adding a lot more solar
- Since 2009, DTE has driven investment of \$3 billion in renewable energy in Michigan and will spend or will support the investment of an additional \$2.8 billion over the next few years
- DTE's investment in renewable energy has created or sustained 4,000 jobs since 2009

As more renewables are added, a balanced mix of renewables will benefit customers, as wind and solar have different performance characteristics

### Illustrative profile of wind and solar generation (MWh)

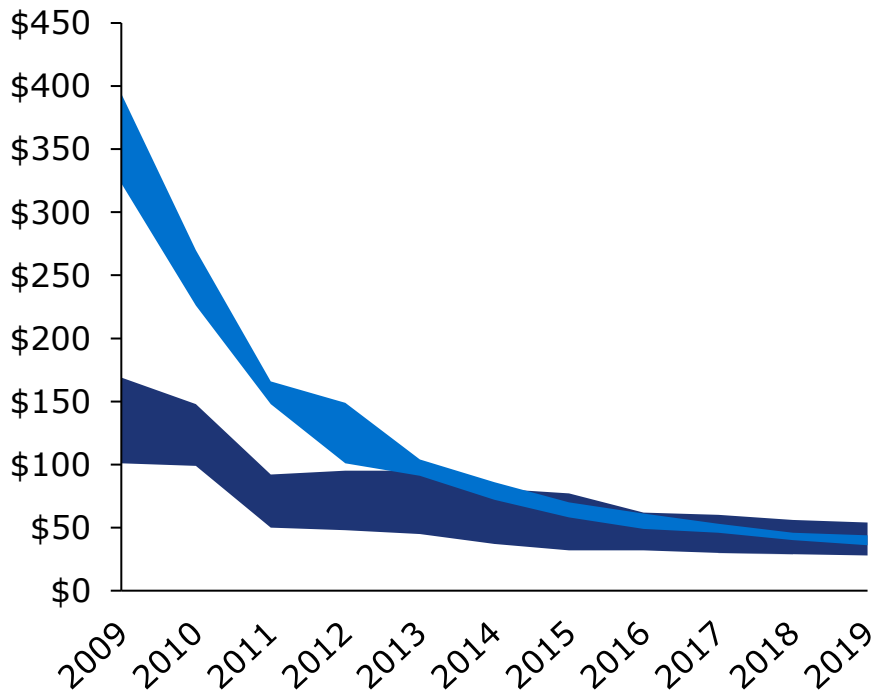
— Wind — Solar — Wind + Solar Portfolio



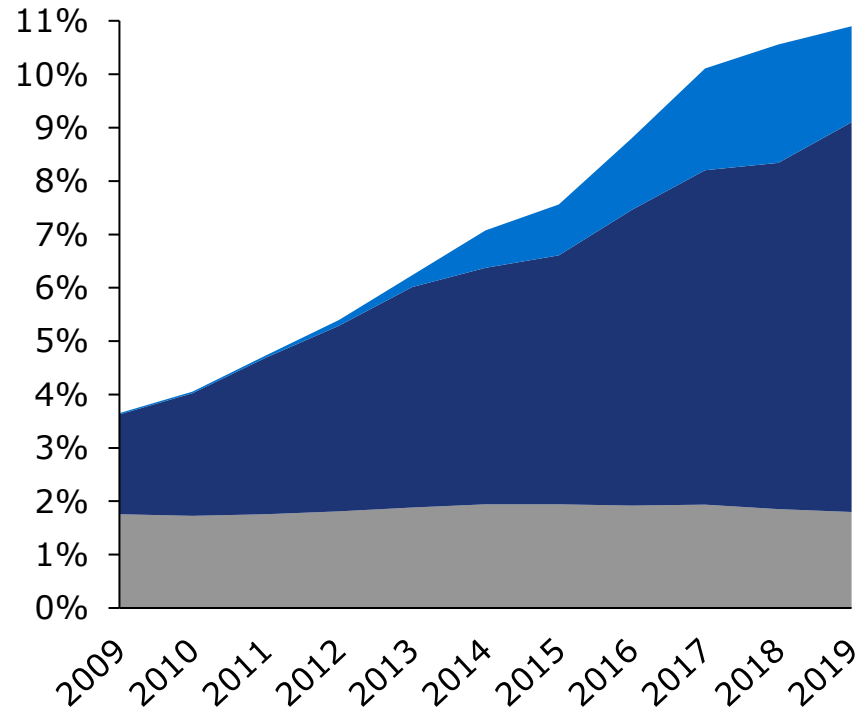
The cost of renewable resources has improved drastically in the last ten years, driving growth in the industry

### Unsubsidized Average Cost of Wind and Solar Generation

(U.S. range - \$/MWh)



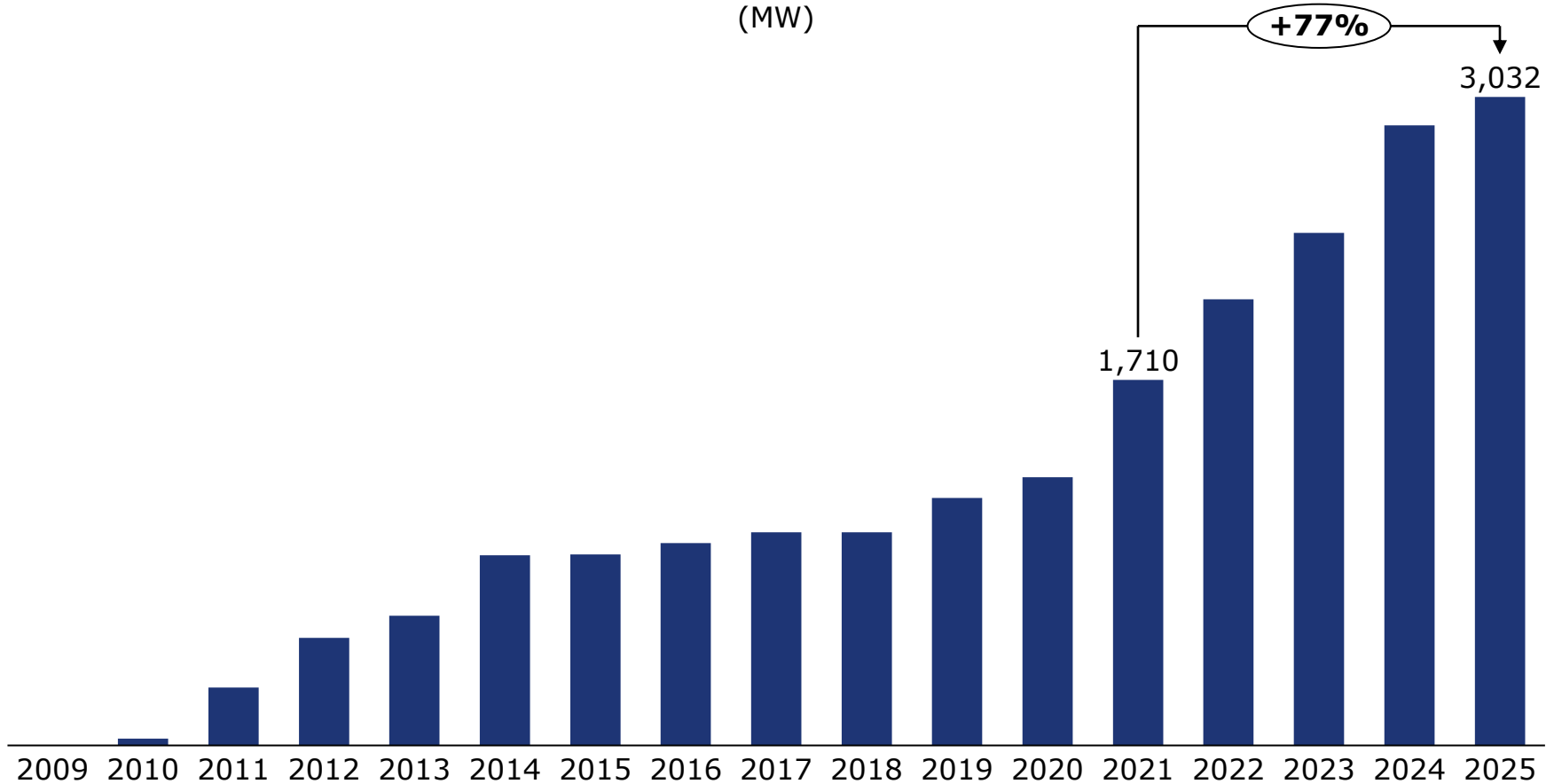
### Renewables Percent of US Generation



■ Solar 
 ■ Wind 
 ■ Other Renewables





DTE's Renewable Portfolio has grown steadily since 2009 and is continuing to grow. We will more than double our renewable energy generation through 2025









**Cumulative Renewable Build**  
(MW)

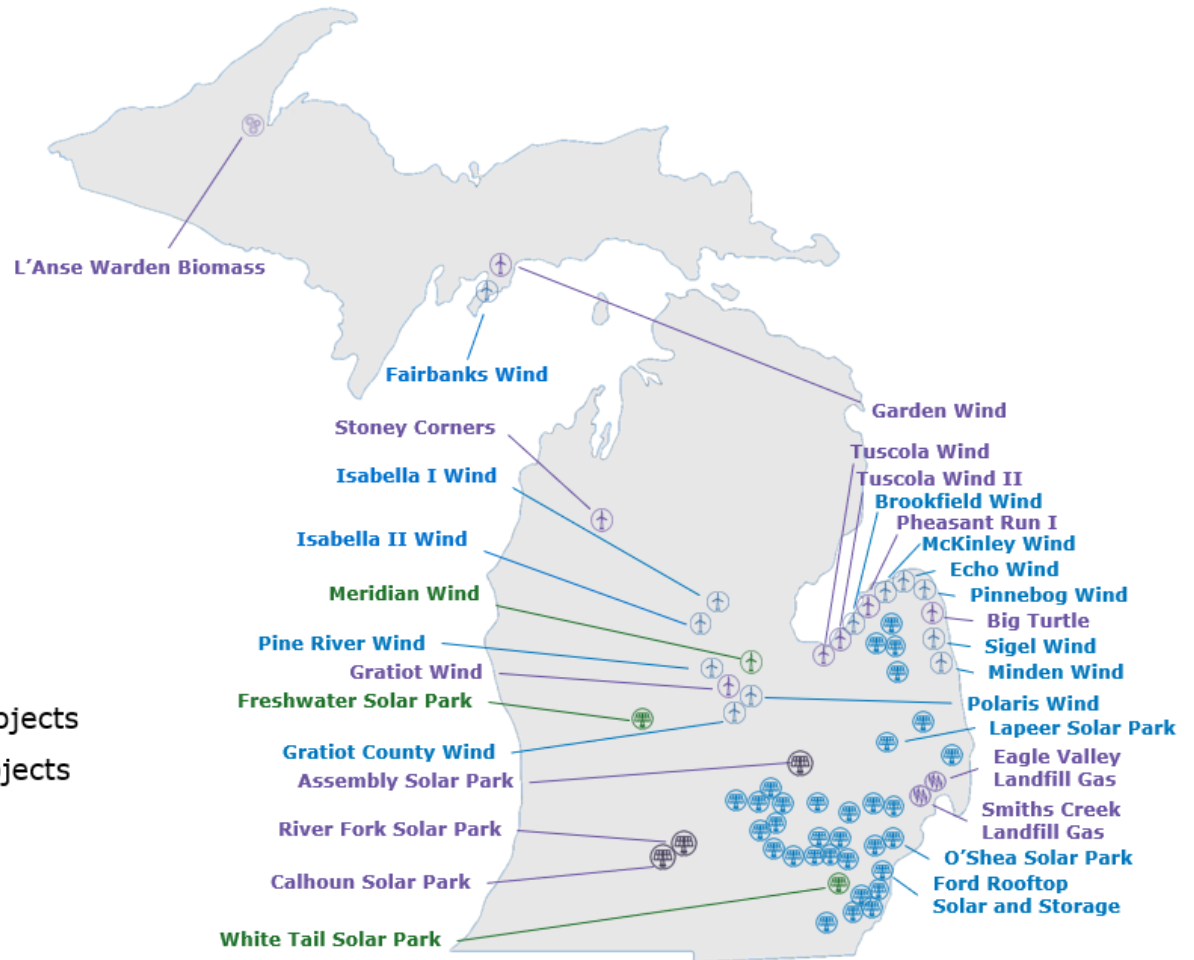


# Our Progress So Far...

## Current Renewable Energy Portfolio

-  18 Wind Projects  
1694MW
-  33 Solar Projects  
144MW
-  2 Landfill Projects  
6.4MW
-  1 Biomass Project  
17MW

-  Wind
-  Solar
-  Landfill Gas
-  Biomass
-  DTE Energy owned projects
-  Third party owned projects
-  Approved Project
-  Proposed Projects





# What's happened recently?

We added two new wind parks in 2021, including the state's largest, and one new wind park and one new solar park so far this year

## Projects in service

- **Isabella I Wind (200 MW) located in Isabella County**
- **Isabella II Wind (183 MW) located in Isabella County**
- **Assembly Solar (79 MW) located in Shiawassee County**
- **Fairbanks Wind (73 MW) located in Delta County**



# What's happening now?

With one more large project coming on line in the next six months

## Projects under construction

- **Meridian Wind (225 MW) located in Midland and Saginaw Counties**



# What's happening next?

DTE will double its renewable energy capacity by 2025, investing an additional \$2.8 billion

## Projects in late-stage development:

- White Tail Solar (120 MW) located in Washtenaw County
- River Fork Solar (49 MW) located in Calhoun County
- Calhoun Solar (100 MW) located in Calhoun County
- Freshwater Solar (200 MW) located in Montcalm County



Renewable energy will continue to play a critical role in DTE's transition to clean energy. Emerging technologies are also key to achieving net zero goals

## Renewable Energy Overview



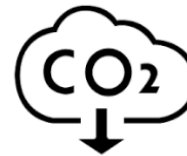
## Introduction to Emerging Technologies



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Small Modular Nuclear (SMR)

# Relentless Pursuit of Innovation

Decarbonization Technologies

Jason Rowell

AVP and Director, New Energy Solutions

# Accelerate

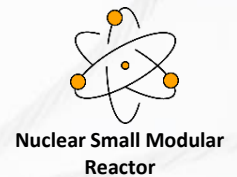
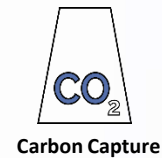
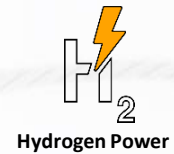
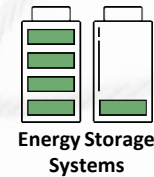
# The Road to Net Zero

- The leading technology choices are clear
  - Renewable energy
  - Electrification
  - Demand-side management
- Yet we cannot control timing of the sun and wind
- Let's give them support to:
  - “Shift” the excess energy to when it's most needed
  - Backup shortfalls when they occur

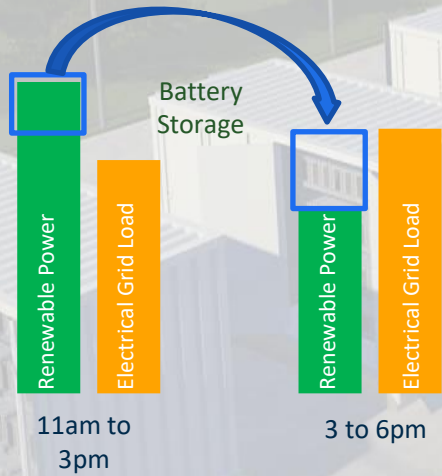
The right supporting technologies accelerates the path to 100% clean energy

# The Supporting Cast

- Too much power at the wrong time of day
  - Store it in batteries
  - “Shift” the power to when customer demand is high
- Too much power for days or weeks
  - Store it with “long duration” technologies
  - Shift it to a rainy day or season with high loads
- Not enough renewables or storage when needed
  - Generate clean power on demand



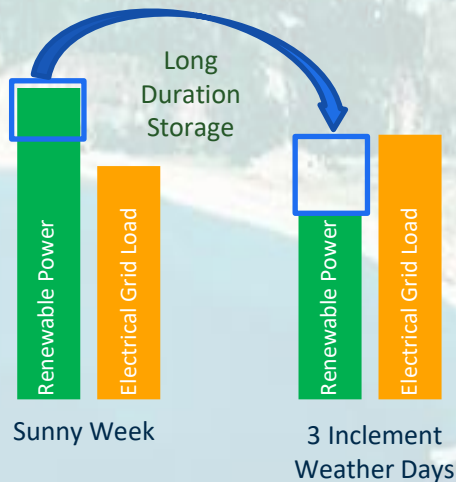
# Battery Energy Storage Systems



- Lithium Ion is the current “best in class”
  - Scalable to support large capacities
  - Flexible to support grid needs
  - Enabler for renewables integration
- Installations rapidly growing
- Best for “day shifting” power
  - Charge and discharge in same day
- 1 to 4 hours of storage



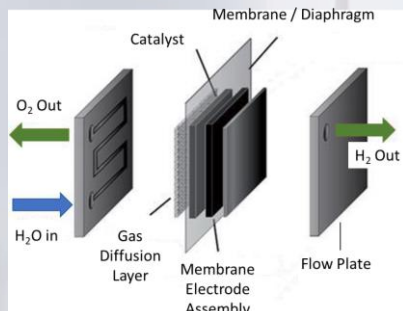
# Long Duration Energy Storage Systems



- Commercial option is pumped hydro
  - Pump water into upper reservoir for storage
  - Release through turbines for power
- Numerous options in development such as:
  - Flow and iron-air batteries
  - Thermal energy storage
  - Kinetic
    - Push rail cars up hill for storage
    - Roll down hill for power
  - Chemical
    - Generate hydrogen for storage
    - Use as fuel for power

# Hydrogen

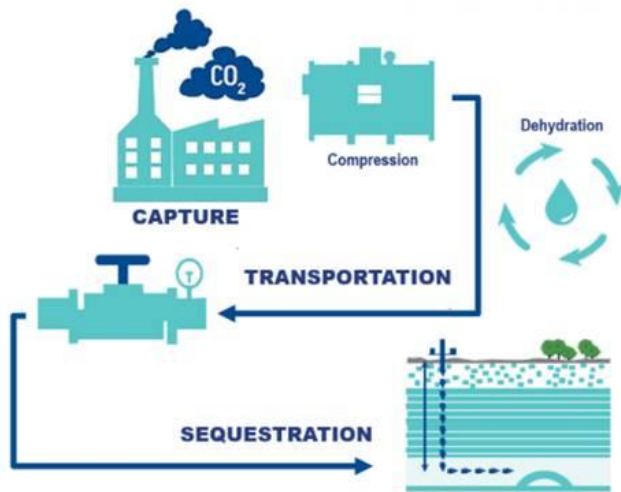
- Most abundant element in universe
- ~100 million tons per year produced
  - Most current production emits carbon
- Future production will be clean
  - “Green” made from water using renewable electricity
  - “Blue” made from natural gas with carbon sequestration
- Carbon-free fuel for generating power



Hydrogen Electrolyzer

Store enormous quantities of energy for long durations and generate power on demand

# Carbon Capture and Sequestration (CCS)



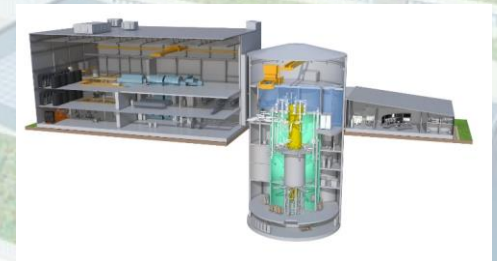
Carbon Capture and Sequestration

- Carbon dioxide (CO<sub>2</sub>) capture in use >40 years
  - Mainly applied to gas processing industries
- Similar technology applicable for power plants
  - 85-95% capture efficiency
  - Improving technologies expected to lower cost
- Per Department of Energy:
  - >600 million tons of CO<sub>2</sub> permanently sequestered
  - > 4,500 miles of CO<sub>2</sub> pipelines
- Technologies developing for beneficial CO<sub>2</sub> use

Allows clean power generation on demand to backup renewables and sustain reliability

# Nuclear Small Modular Reactors (SMR)

- Inherently safe designs
- Much improved fuel usage
  - Up to 20 years between refueling
- Factory built to a large extent
  - Improved quality, quicker to implement
- Enabler for renewables integration
  - Carbon free, on demand power
  - Can cycle up and down to follow load



GEH BWRX-300 (Generation III+ SMR Example)

Yet...still many hurdles to clear and >10 years from wide commercial adoption





# Contact Us

Building a World of Difference

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We look forward to your continued engagement. Please save the dates for the future meetings and visit our website or contact us at any time for additional information

### Public Open House Meetings

Date	Topic(s)	Additional Information
<b>January 18</b>	<ul style="list-style-type: none"> <li>Introduction to CleanVision Plan</li> <li>Overview of Integrated Resource Planning</li> </ul>	<ul style="list-style-type: none"> <li>Presentation, recordings and transcripts posted on website</li> </ul>
<b>February 22</b>	<ul style="list-style-type: none"> <li>Renewable Energy Overview</li> <li>Introduction to Emerging Technologies</li> </ul>	<ul style="list-style-type: none"> <li>Presentation posted on website; recordings and transcripts from today coming soon</li> </ul>
<b>March 22</b>	<ul style="list-style-type: none"> <li>Energy Waste Reduction and Demand Response</li> <li>MIGreenPower</li> </ul>	<ul style="list-style-type: none"> <li>1:00 pm: <a href="#">Teams Live LINK</a></li> <li>6:00 pm: <a href="#">Teams Live LINK</a></li> </ul>
<b>April 19</b>	<ul style="list-style-type: none"> <li>Coal Plant Retirements and Transition (i.e., Retire with PRIDE)</li> <li>Grid Modernization and Reliability</li> </ul>	<ul style="list-style-type: none"> <li>1:00 pm: <a href="#">Teams Live LINK</a></li> <li>6:00 pm: <a href="#">Teams Live LINK</a></li> </ul>

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# Questions



# Thank You!

Thank you for joining us!

- You may find additional information, including a copy of this presentation, on our website [dtecleanenergy.com](http://dtecleanenergy.com)
  - We will be posting recordings and transcripts of today's public meetings on our website in the coming days
  - Please check on our website for future meeting information, including time and meeting links
- You may also find an FAQ on our website; we would like your feedback on any additional questions you may have
- Please submit your question(s) or comments on our website, linked above, or at [DTE\\_Electric\\_CleanVision@dteenergy.com](mailto:DTE_Electric_CleanVision@dteenergy.com) ([link](#)) at any time