DTE Energy®

Integrated Resource Planning (IRP) Stakeholder Engagement Workshop

Workshop #1

June 11, 2018

DTE Energy®

Welcome Remarks

Executive Summary

- The Michigan Public Service Commission (MPSC) integrated resource planning (IRP) filing requirements has outlined recommendations for performing public outreach prior to filing an IRP. As part of the MPSC IRP filing requirement in Public Act 341, participant engagement in the development of the IRP is strongly encouraged

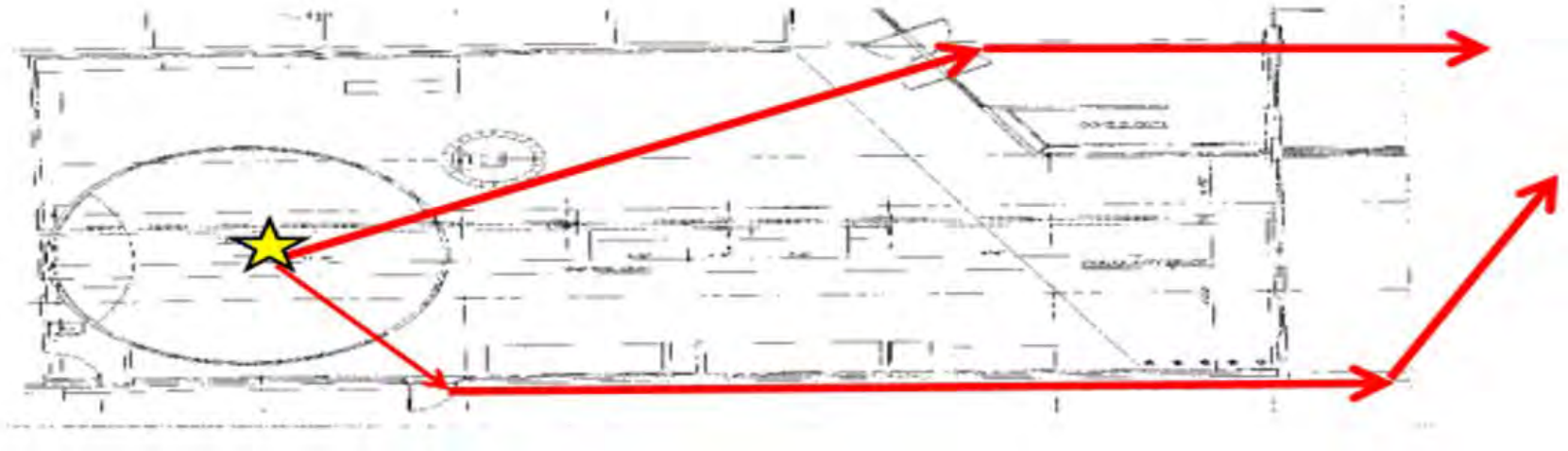
- In the 12 months prior to an IRP filing, electric utilities are encouraged to host workshops with interested participants for input and to stay informed regarding:
    1. The assumptions, scenarios, and sensitivities
    2. The progress of the utility's IRP process

- There will be two additional public meetings to educate the public on the utilities planning process as well as provide an opportunity for public comments. One additional stakeholder engagement workshop will be held as well

- DTE will be filing an IRP on March 29, 2019

Building Safety

- In the case of an emergency, follow the plan below to exit the building, and gather at the entrance to the parking lot, in front of DTE Energy sign.



- Please stay with designated DTE Escort
- Restroom Location

Workshop Agenda

- Introductions
  - Facilitators
  - Presenters
  - All Stakeholders present

- The workshop will be broken into three parts:
  1. Presentation
  2. Questions
  3. Comments

Questions and comments will be taken after the presentation and should be written on the question and comment cards

- After the presentation, we will break for about 10 minutes
- Comments and questions should be written down on the question and comment cards, which will be collected during the break
- There are two separate cards; one for questions and one for comments
- We ask that each topic has its own question card and own comment card as we will group them into themes
- The moderator will read the questions and a DTE subject matter expert will provide a response; comments will also be read

Presentation Agenda

- **DTE Environmental Stewardship**
- Update on 2017 IRP and CON
- Objectives of the 2019 IRP
- IRP Process including planning principles
- Updates since the 2017 IRP
- Resource Alternatives cost assumptions and source
- Fleet Fuel Mix
- Scenarios and Sensitivities
  - Required
  - DTE Additional
  - Stakeholder Additional Sensitivities
- IRP timeline

DTE has a long history of environmental stewardship, including our 2050 carbon goal

- Our commitment to reduce carbon emissions more than 80% by 2050 was one of the first and most aggressive commitments by an electric utility in moving towards a more decarbonized economy

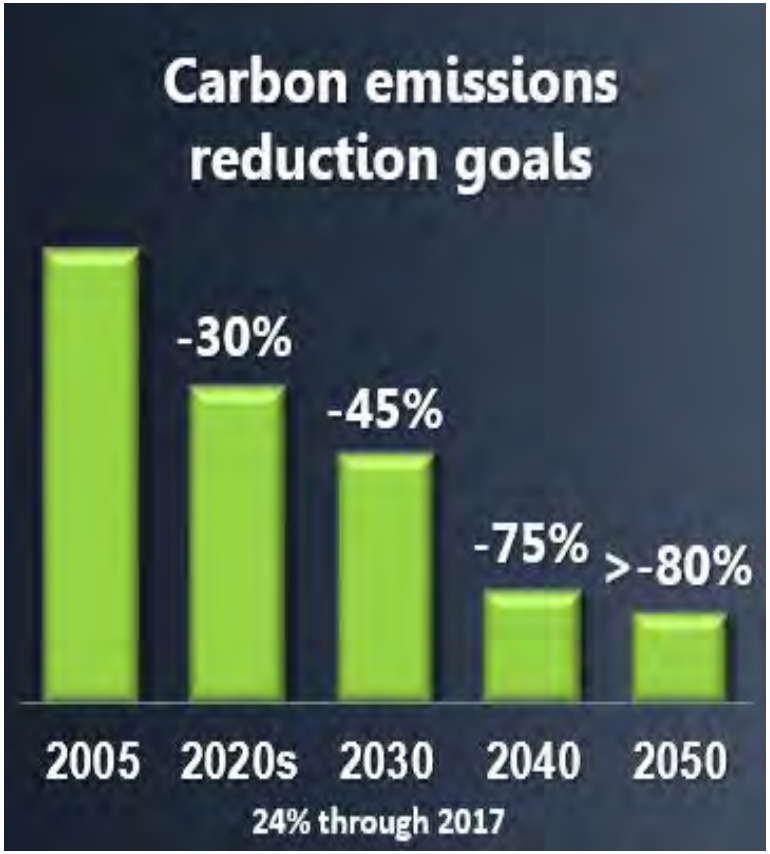
- We have made significant strides over the last several decades in reducing emissions from our power plants, spending more than $2.4 billion to meet new emission standards

- We don't just stop at compliance with environmental requirements, we go above and beyond what is required to demonstrate our commitment to being a good steward of the environment:
  - More than 30 DTE facilities are certified by the Wildlife Habitat Council's Conservation Certification program
  - All DTE Electric and DTE Gas facilities to be certified to the ISO 14001:2015 standard by the end of 2018

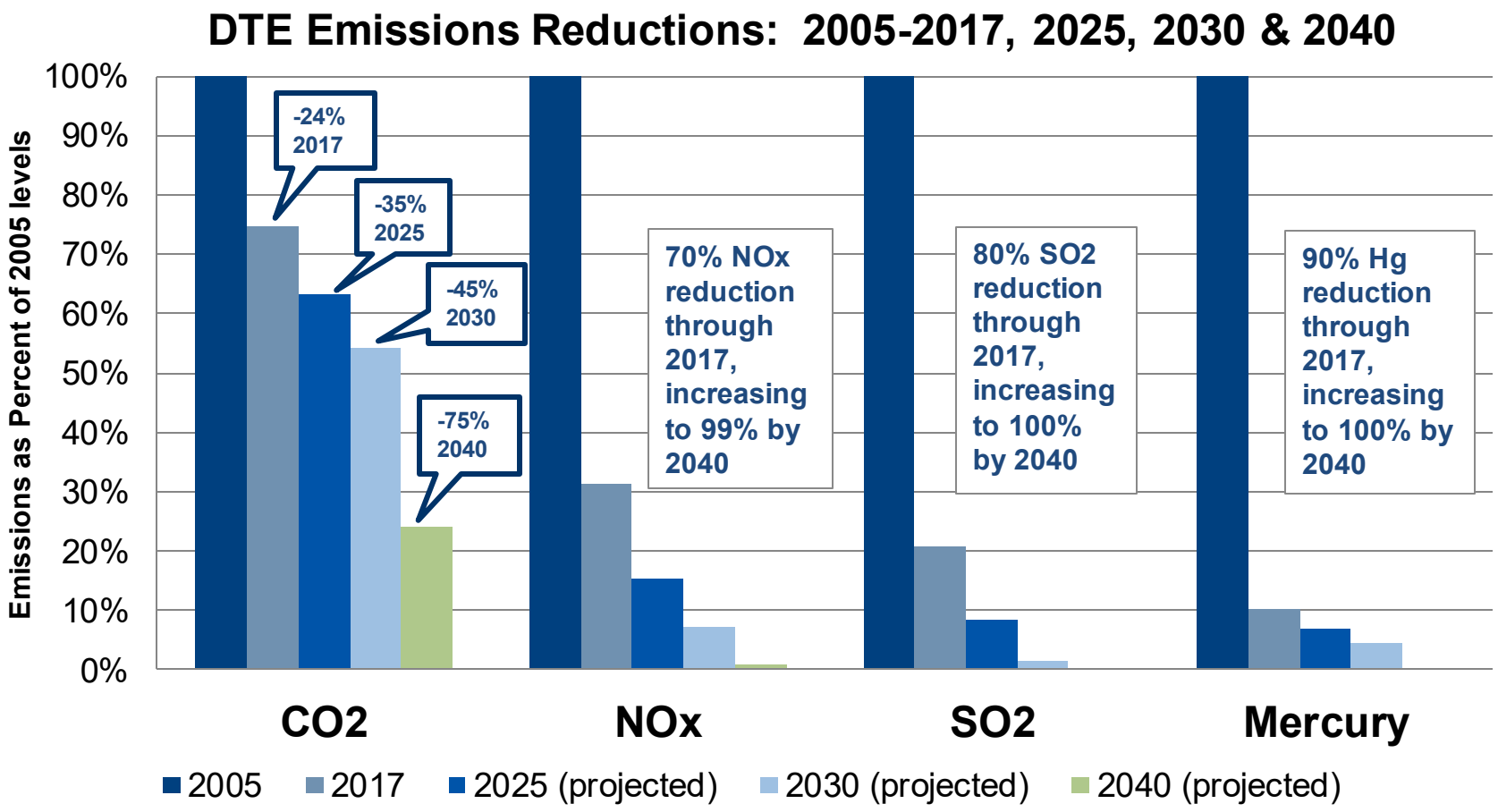
Continuing our history of environmental stewardship, DTE announced an aggressive long-term carbon reduction plan in 2017

Announced in May 2017, our carbon reduction goal will:

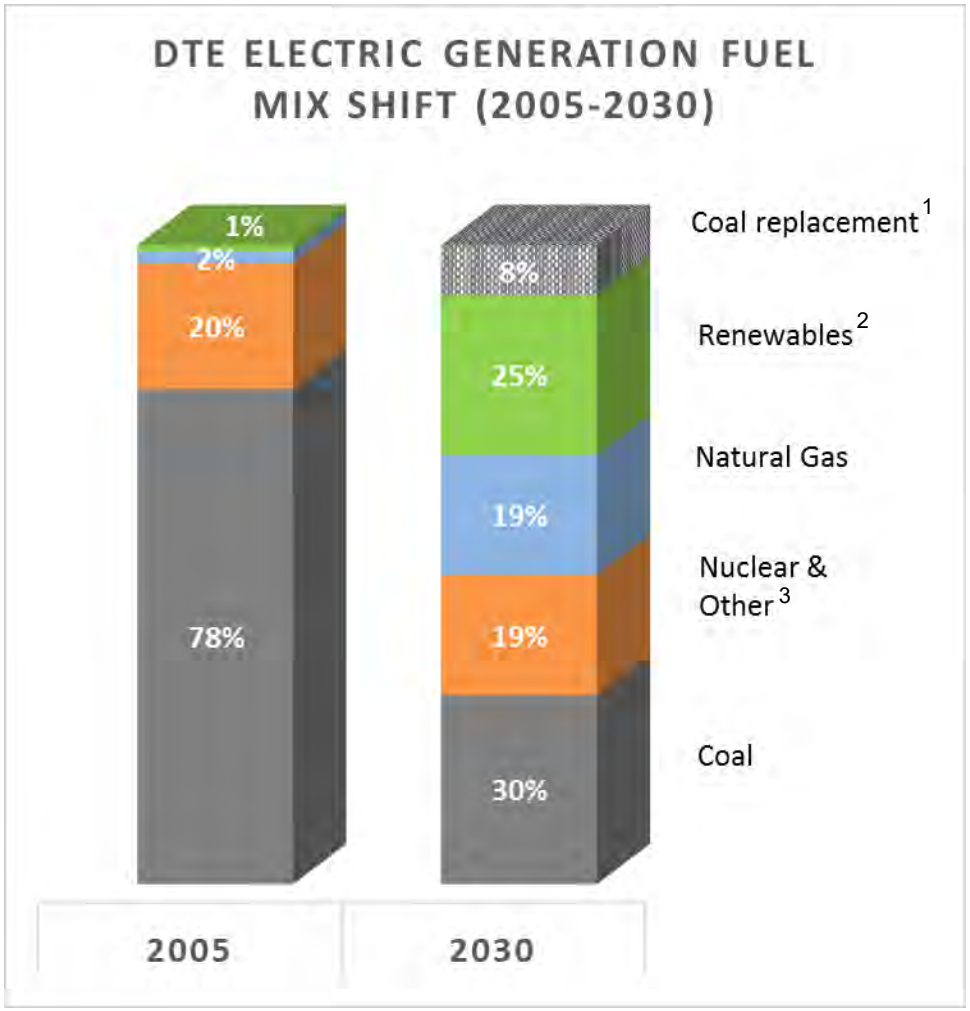
- Cut carbon emission by more than 80% by 2050
- End the use of coal-fired generation by 2040
- Construct up to 4,000 MW of renewables
- Utilize our Fermi 2 nuclear power plant through 2045



Since 2005, DTE has significantly reduced emissions from electric generating plants and this trend will continue as we retire coal plants



Our energy mix to supply energy will become more diversified as we achieve our long-term carbon goal



- Our 2030 renewable commitment is part of the recently announced 50 percent Clean Energy Goal by 2030
- We will monitor the energy landscape over time to make adjustments in our energy mix that brings the most affordable and reliable energy to our customers while still achieving our carbon reduction goals

1. "Coal replacement" = resources to be determined with IRP
2. Includes RECs; total GWH adjusted for RECs
3. "Other" includes pumped storage and peaking units

We are proud of our history of environmental stewardship

- More than 30 DTE Energy facilities are certified by the Wildlife Habitat Council's Conservation Certification program
- Over 8,000 acres of DTE property is dedicated to habitat and biodiversity
  - 800 acres of prairie and wetland habitat for Monroe Public Schools
  - Shoreline restoration projects
  - 30 pollinator gardens
  - Partnering with employees and scouts to build nesting structures
- Proud partners with conservation agencies
  - Ducks Unlimited
  - The Nature Conservancy
  - Michigan Environmental Council
  - Michigan Dept. of Natural Resources
  - U.S. Fish and Wildlife Service
  - And many others

Bald Eagle Nest at the Belle River Power Plant

Our environmental stewardship includes going above and beyond regulatory compliance

- We have been certified to the ISO 14001 standard for Environmental Management Systems since 2001
- By the end of 2018, all of DTE Energy Electric and Gas utility operations will be upgraded and certified to the 2015 ISO 14001 Standard

ISO 14001 is an international standard that specifies requirements for an effective environmental management system using a framework that follows the plan-do-check-act (PDCA) system for continual improvement in managing environmental impacts

NSF ISR

Certificate of Registration

This certifies that the Environmental Management System of

DTE Energy

One Energy Plaza
Detroit, Michigan, 48226, United States

has been assessed by NSF-ISR and found to be in conformance to the following standard(s):

ISO 14001:2015

Scope of Registration:

Energy providing functions and all related field, distribution and operation services and activities associated with gas transmission, gas storage and solar and wind renewable energy, at the DTE Energy facilities listed on the annex pages of this certificate.

ANAB ACCREDITED

IAF

Certificate Number:	1Z662-EM1
Certificate Issue Date:	20-DEC-2017
Registration Date:	10-NOV-2017
Expiration Date *:	09-NOV-2020

Carl Blazik,
Director, Technical
Operations & Business Units,
NSF-ISR, Ltd.

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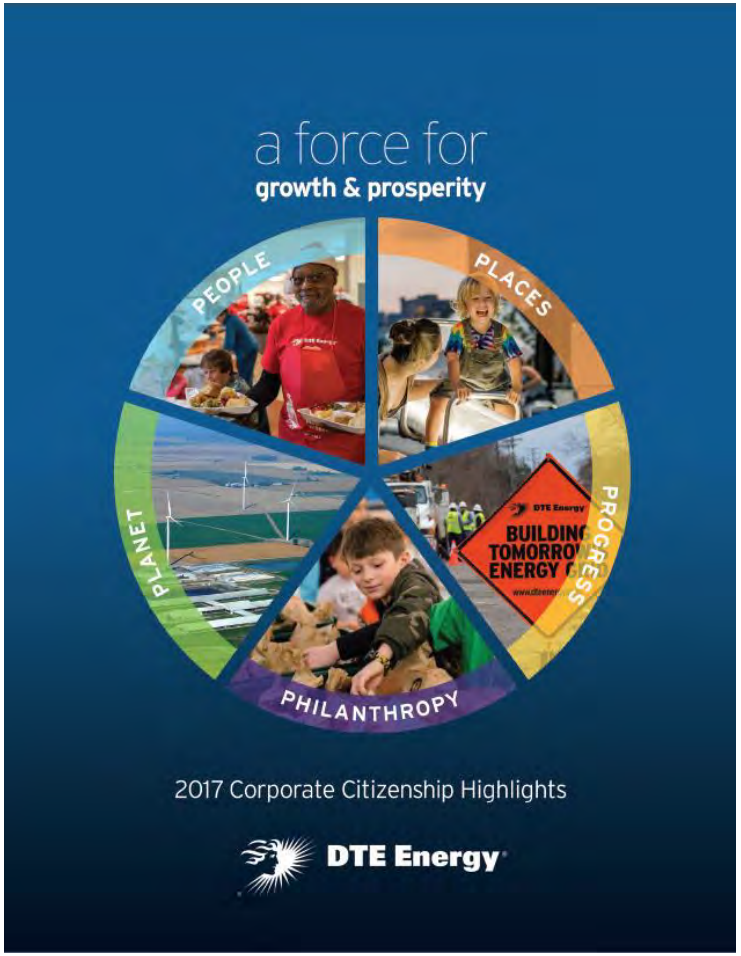
NSF International Strategic Registrations

More on DTE's environmental sustainability efforts can be found in our Corporate Citizenship Report

Learn more at DTEImpact.com



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- IRP timeline

On April 27, 2018 DTE Electric received the final order in case U-18419 (2017 IRP and CON)

- Three CONs(Certificate of Necessity) granted April 27, 2018 for the 1,100 MW CCGT(Combined cycle gas turbine) at an approved cost of $951.8 Million

- Commission Comments on future IRPs:
  - CONs are now required for generation projects above 225 MW
  - Stakeholder collaboration will be an integral part of DTE Electric's IRP process
  - The PROMOD model is an appropriate modeling tool for retirement analysis
  - Staff to further examine risk assessment methodologies and best practices
  - Requirement to run clean energy scenario

Clean Energy has been a part of three recent filings: cases U-18262 EWR 2018-19; U-18419 2017 IRP/CON and U-18232 REP 2018-2023

Renewables Nameplate MW	current	2019	2020	2021	2022	2023
Wind	909	161	169	300	225	150
Solar	71		10	3		
Landfill Gas/Biomass	23					
Total Cumulative	1,004	1,165	1,175	1,647	1,872	2,022

- The 2017 IRP had EWR at 1.5% until 2025
- The updated potential study will extend 1.5%

The Renewable plan is from the 2018 REP U-18232 filing

The EWR plan for 2018-19 is from DTE Electric 2018 – 2019 Energy Waste Reduction Plan (Case No. U-18262) and 2020-2030 is from 2017 IRP filing

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There are multiple objectives of 2019 IRP

1. Satisfy the 341 6(t) requirements
2. The DTE Reference case will be a plan to achieve the interim goals associated with the ultimate goal of 80% CO_2 reduction by 2050[1] target
   - 45% by 2030
   - 75% by 2040
3. More transparent process that incorporates stakeholder collaboration
4. Develop a plan using our planning principles
5. Emphasis is on long term planning; the study will cover mid-term decisions (5-10 years) and their impacts over the longer term (20 years+)

1. Reduction from 2005 emissions

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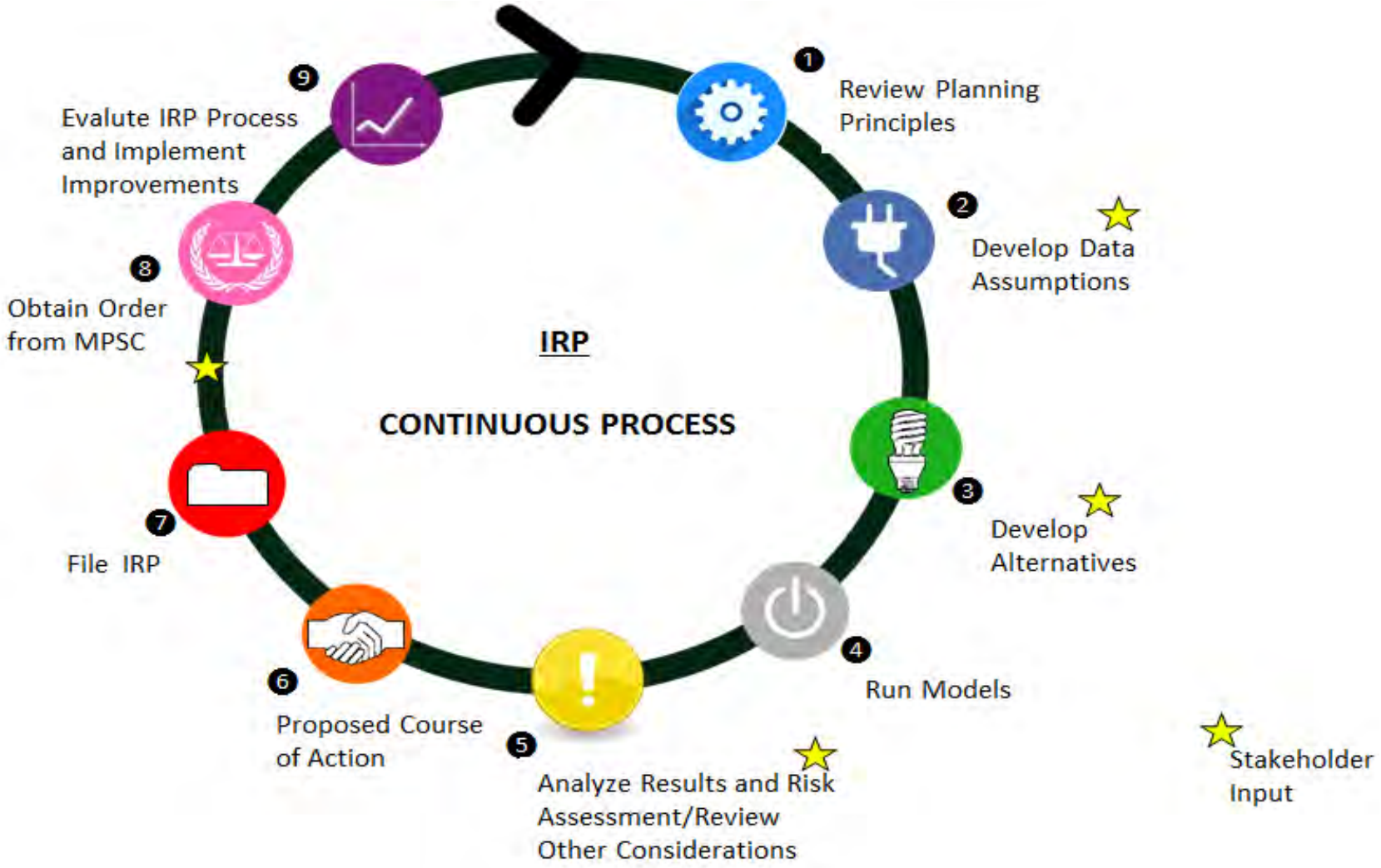
The IRP Process contains nine key steps to ensure the completion of a comprehensive plan



DTE Electric utilizes Planning Principles in IRPs and other planning

RELIABILITY	Each plan analyzed is required to meet the reliability planning requirements established by MISO and to encompass our desire to maintain a reliable fleet in the face of aging coal units.
AFFORDABILITY	Affordability is measured by the yearly impacts to the revenue requirement
CLEAN	Environmental sustainability, low carbon aspirations, and clean energy goals are major factors in the determination of the recommended resource portfolio
FLEXIBLE AND BALANCED	The resource plan needs to be flexible, having the ability to adapt to unforeseen changes in the market. Additionally, it must have a well balanced mix of resources so that it is not heavily reliant on the market or one source of generation
COMPLIANT	All resource plans are modeled to be compliant with the IRP filing requirements as well as environmental regulations
REASONABLE RISK	The Company desires a portfolio that minimizes risks related to commodity and market pricing, fuel availability, grid reliability, capacity constraints, operations and evolving regulations

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Data and assumptions will be updated for the 2019 IRP

Inputs for 2019:

- Latest publicly available alternative costs
- Latest market assumptions based on capital cost, fuel prices, and environmental inputs
- MISO renewables penetration study
- Transmission alternative and transmission build sensitivities from ITC
- Energy Waste Reduction from Updated GDS EE potential study and Demand Response programs based on 2017 Statewide DR potential study
- Updated Retirement analysis
- Clean Energy Target of 50% by 2030 (Energy Efficiency + Renewables)
- 25% Renewables by 2030

Enhancements have been made since the 2017 IRP based on DTE Energy's Continuous Improvement Principles and feedback received

- Further explanation of the relationship between EWR, load forecast, and modeling to be included in report
- Will utilize new potential studies to provide guidance on DR and EWR program levels
- Technical costs are transparent since they are from public source
- Holding public outreach events in service territory to obtain questions/concerns from our customers
- Inviting stakeholders to provide inputs to sensitivities for modeling
- Modeling enhancements: sensitivities to include smaller blocks of renewables, additional transparency for modeling methodology, simpler financial inputs into Strategist
- Plan to increase the number of full national footprint market modeling for scenarios/sensitivities from six to seven or more

?

Outstanding question: Which escalation rate should be used for IRP inputs?

- The EIA escalation rate (2.3% average)
- The DTE escalation rate, which matches the company's load forecast (2.1% average)
- A hybrid of the two?

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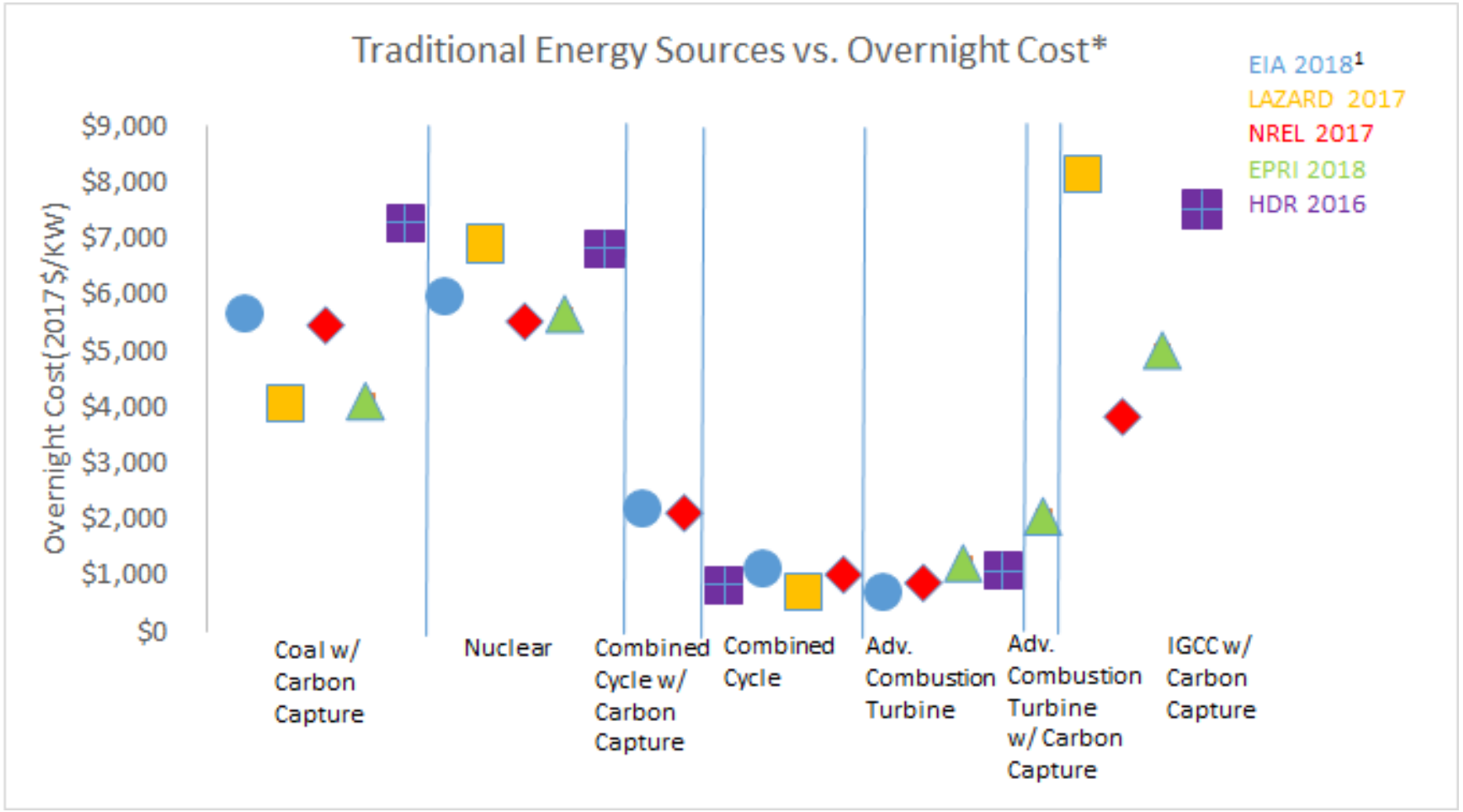
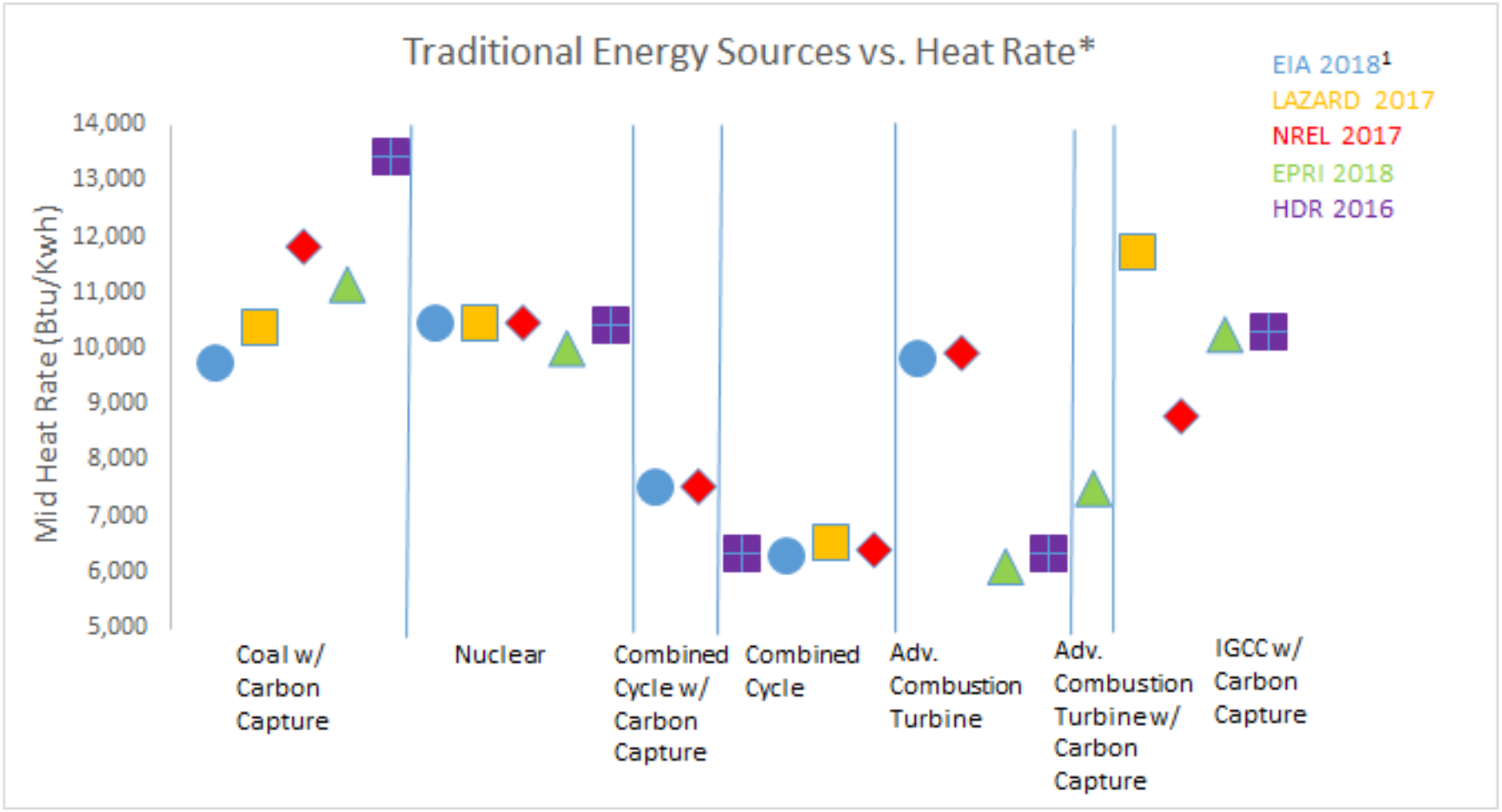
For Large Dispatchable (traditional) energy source, the EIA source will be used if available. EPRI will be used if EIA is not available



1. Year given corresponds to year report was published

*If three numbers were given, the middle number was used. If two numbers were given, the average was used. If single number given, that number was used.

Corresponding operating characteristics from the EIA and EPRI sources will be used for Large Dispatchable (traditional) alternatives as applicable



1. Year given corresponds to year report was published

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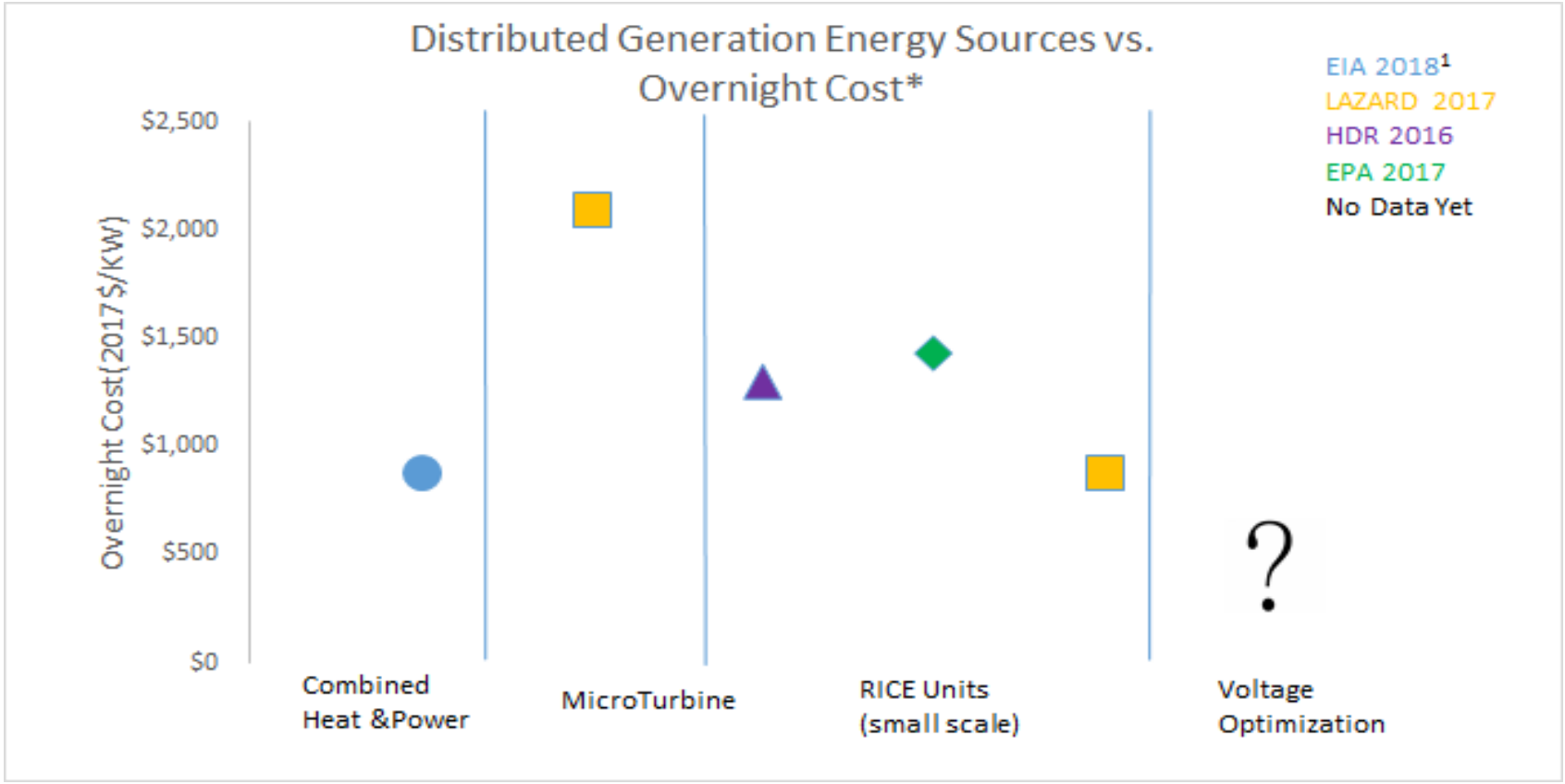
The Company is still reviewing the distributed alternatives as well as the storage alternatives

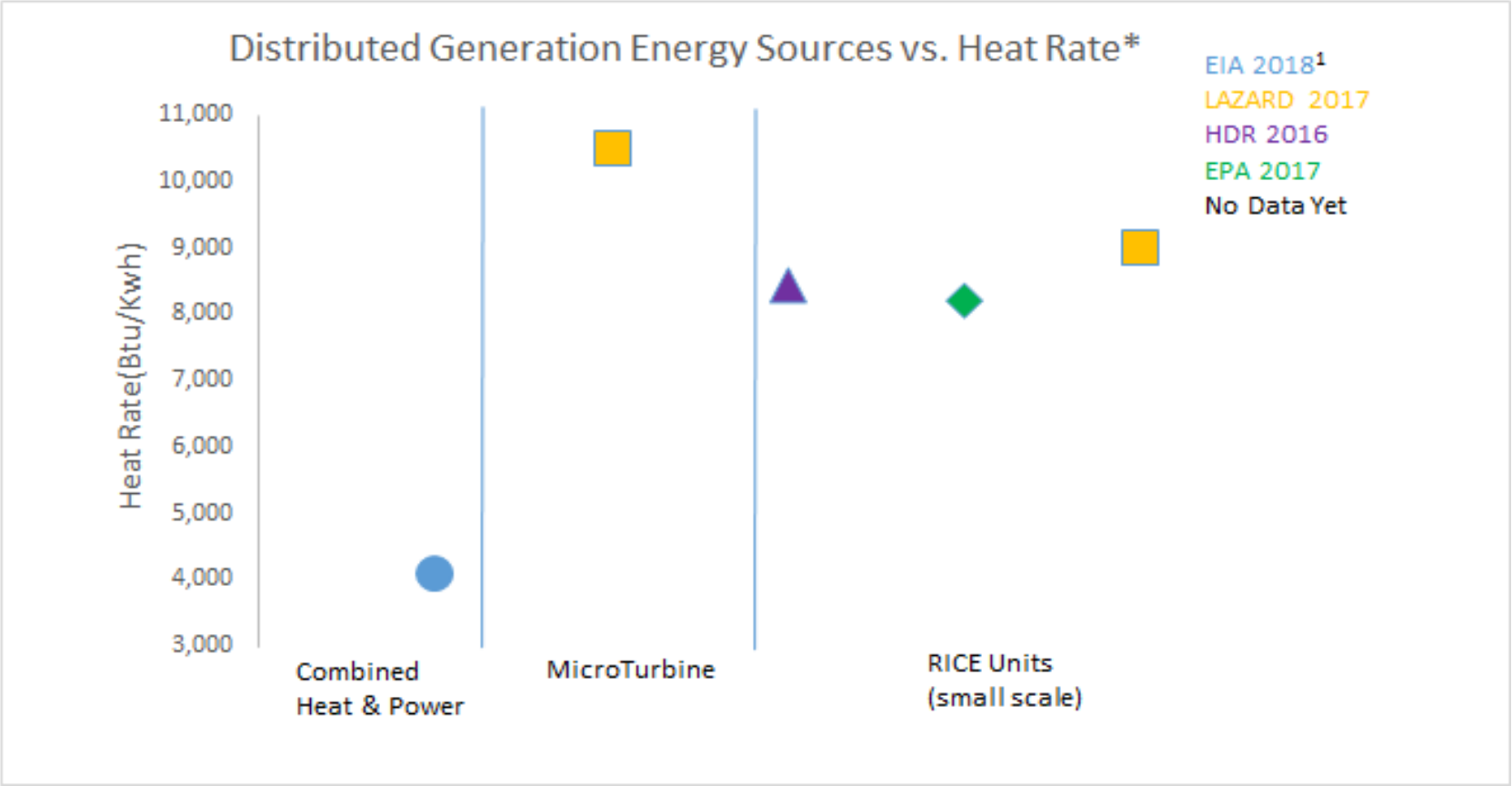


? Outstanding Question: We are actively seeking assistance with locating publicly available data on the Overnight Cost of Voltage Optimization, as a Distributed Generation resource

1. Year given corresponds to year report was published

*If three numbers were given, the middle number was used. If two numbers were given, the average was used. If single number given, that number was used.

Distributed generation energy sources by median heat rate



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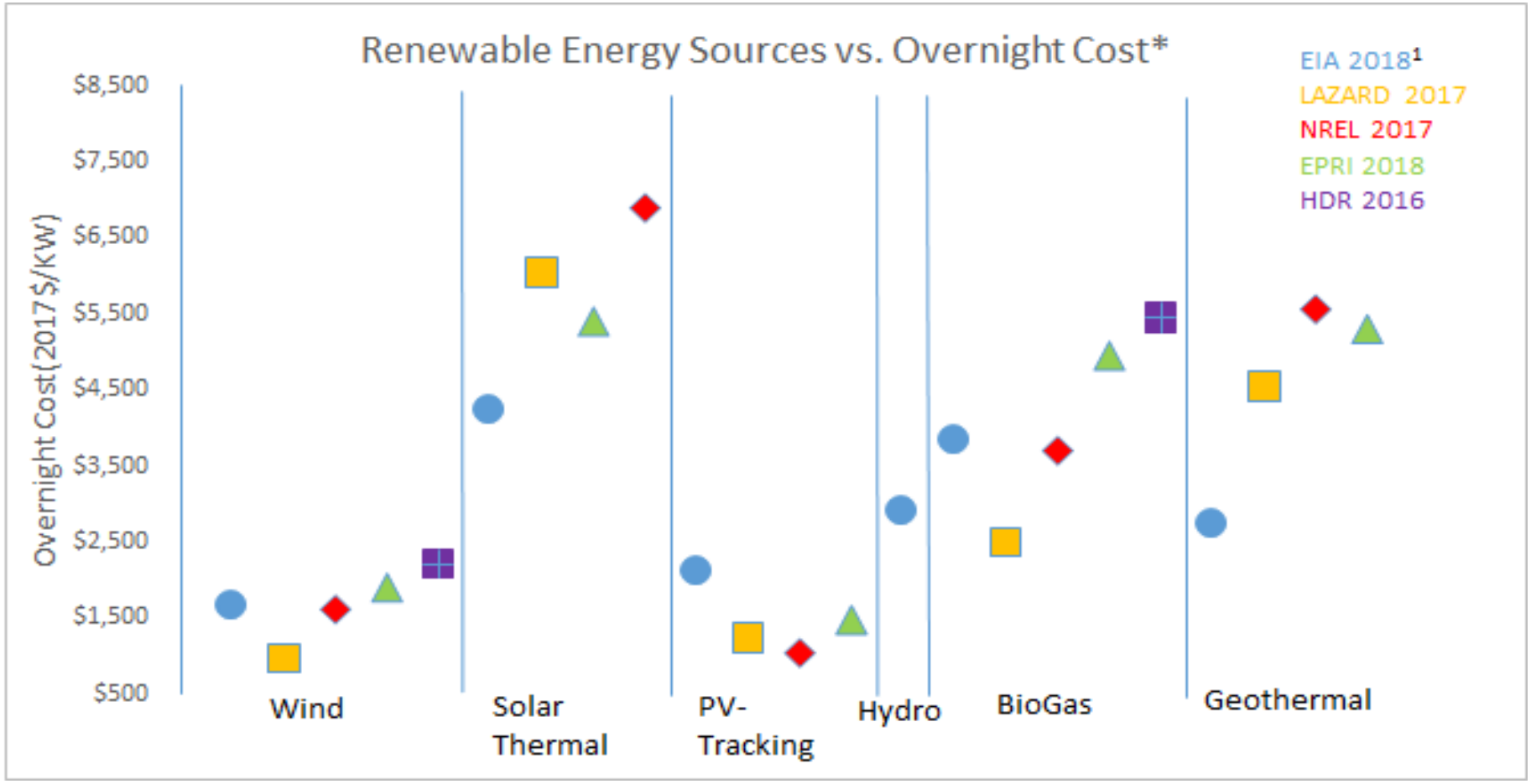
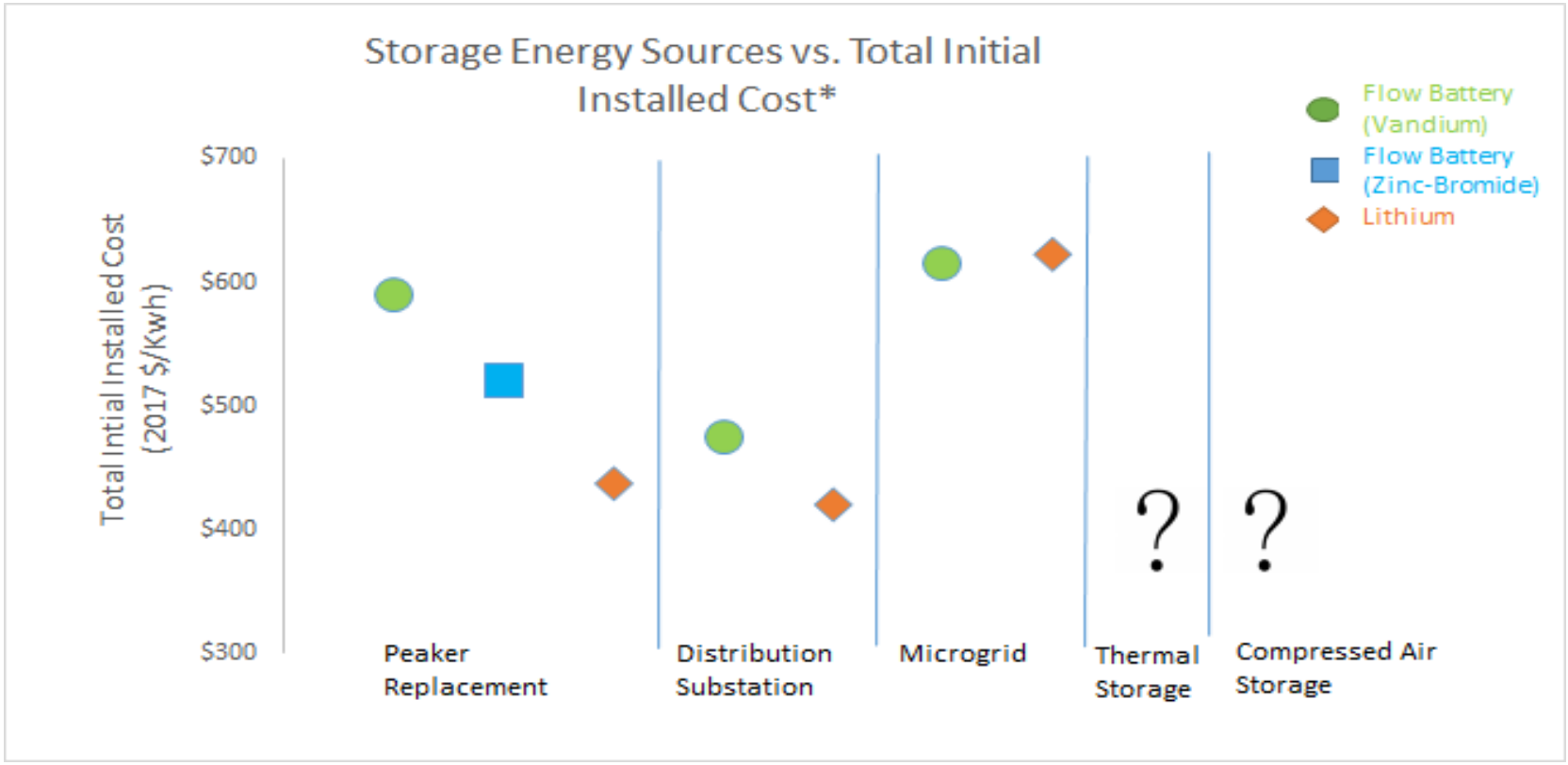
The NREL Annual Technology Baseline will be the source used for renewable energy alternatives



1. Year given corresponds to year report was published

*If three numbers were given, the middle number was used. If two numbers were given, the average was used. If single number given, that number was used. For NREL the low number was used.

The Lazard source will be used for storage energy alternatives, shown here by median total initial installed cost

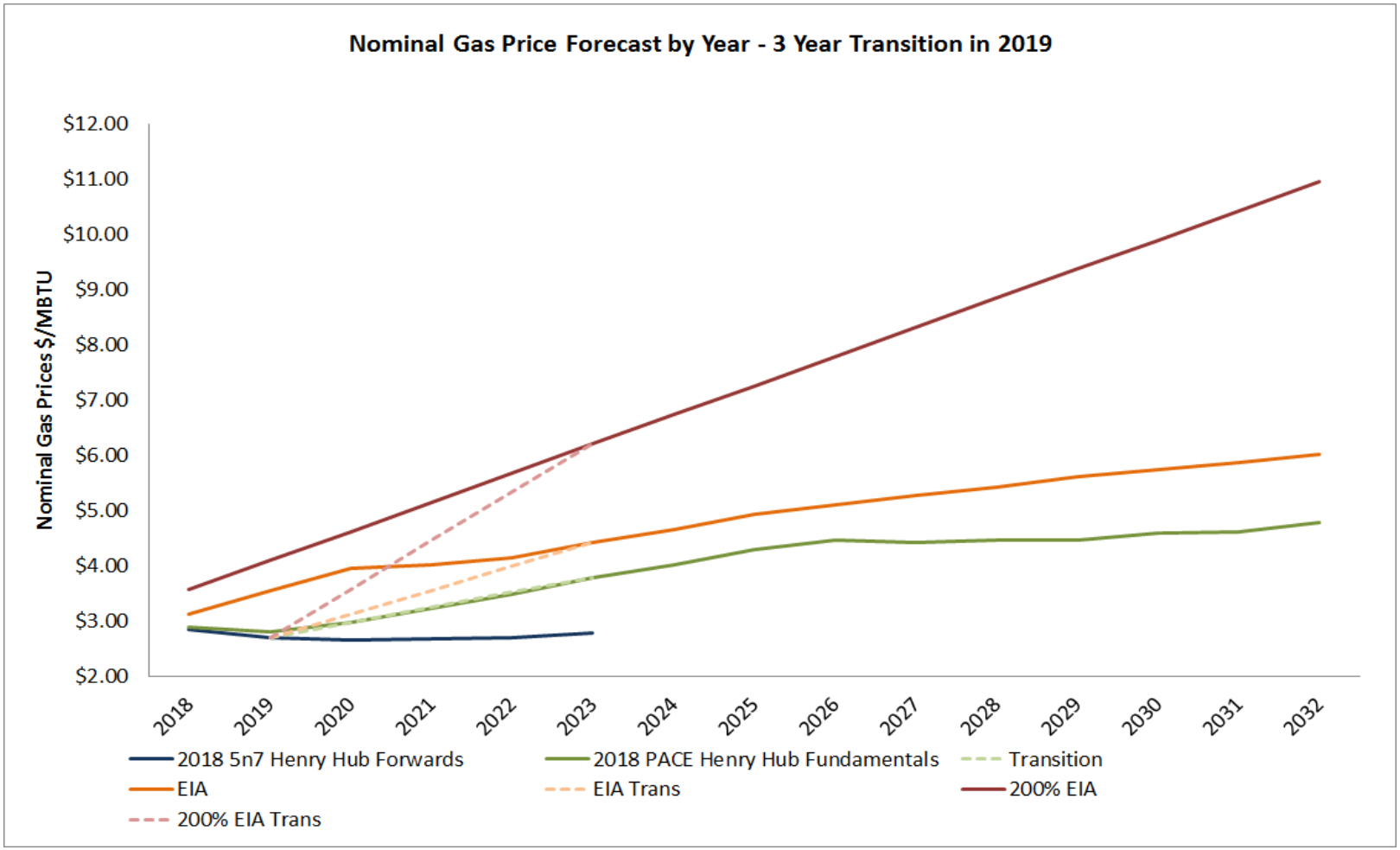


? Outstanding question: We are actively seeking assistance with locating publicly available data on the Installation Cost of Thermal Storage and Compressed Air Storage

1. Data from LAZARD 2017

*If three numbers were given, the middle number was used. If two numbers were given, the average was used. If single number given, that number was used.

For natural gas prices, the 2018 EIA forecast will be used after a three year transition from the forward price curve



1. EIA prices from February 2018 EIA Report
2. DTE Reference from 2018 PACE

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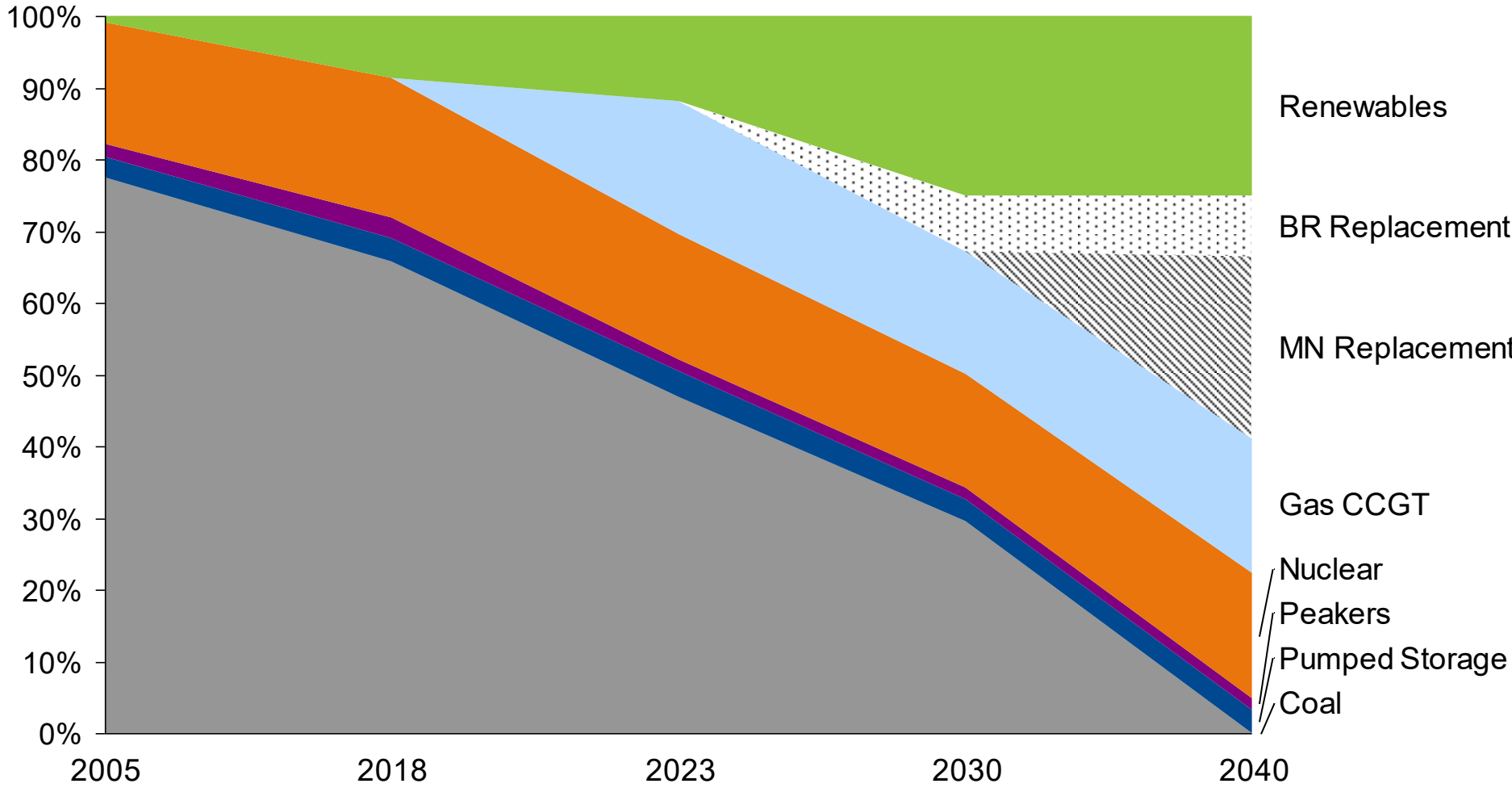
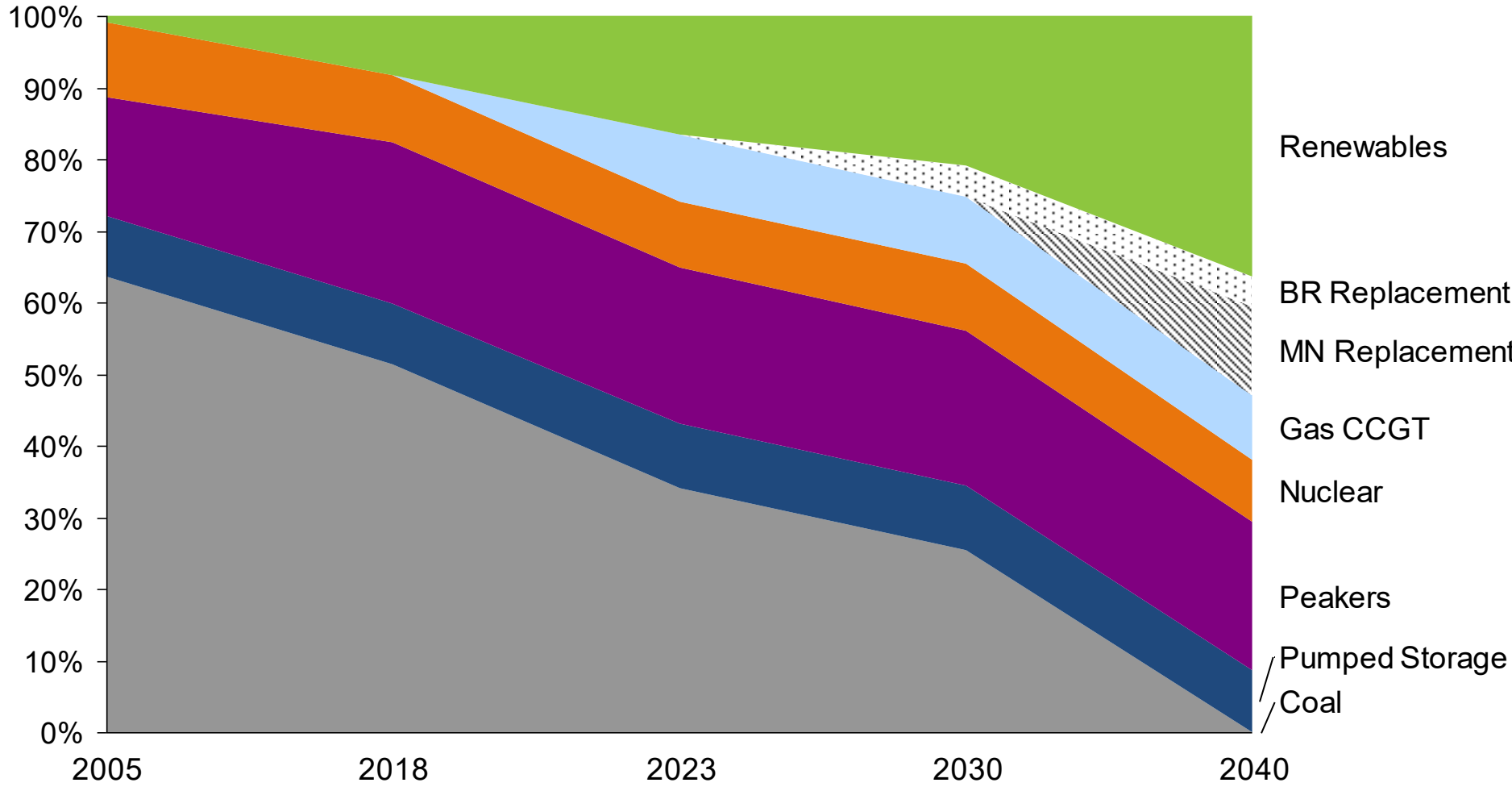
Fleet Fuel Mix – Generation (GWH)



1. Includes RECs; total GWH adjusted for RECs

Fleet Fuel Mix – Nameplate Capacity (MW)



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Four Scenarios are currently planned; three specified scenarios from the modeling requirements as well as the DTE Reference Scenario

Scenario	Description
Business as Usual	• Existing generation fleet largely unchanged • Units granted regulatory approval are modeled • Demand and energy remain at low loads • Thermal and nuclear generation retirements in the modeling footprint are driven by max age, public announcements or economics
Emerging Technology	• Technological advancement and economies of scale result in a 35% reduction in cost for DR, EWR, storage, and solar • Retirements of all coal units except the most efficient should be considered
Environmental Policy	• Carbon regulations targeting a 30% reduction in 2030 • Coal units primarily will retire based on carbon emissions, then economics • Lower renewable costs by 35%
DTE Reference	• Utilize DTE gas forecast • Incorporate DTE CO2 targets • Current retirement plan as base

The Business As Usual scenario is one of the required scenarios

	Base	Sensitivities
Load Growth	DTE Forecast	High, 50% Choice Return
EWR	1.5% per year – 2018 potential study	2.5% per year
Capital Cost	Public Sources	
Renewable	35% Clean Energy Goal (Renewable & EWR)	
Gas Price	EIA Forecast	200% of EIA forecast
Retirement	DTE plan	Adjust tier 2 early
Demand Response	2017 State of MI Potential Study	
Available Replacement		CT Only

The second required scenario is the Emerging Technology scenario

	Base	Sensitivities
Load Growth	DTE Forecast	High
EWR	1.5% per year – 2018 potential study	2.5% per year
Capital Cost	Decrease renewable / battery / EWR costs by 35%	
Renewable	35% Clean Energy Goal (renewable & EWR)	25% by 2030
Gas Price	EIA Forecast	200%
Retirement	DTE Plan	Adjust tier 2 early
Demand Response	2017 State of MI Potential Study	
Available Replacement		Defer second CCGT with EWR, DR, and renewables

The last required scenario is the Environmental Policy scenario

	Base	Sensitivities
Load Growth	DTE Forecast	High
EWR	1.5% per year – 2018 potential study	2.5% per year
Capital Cost	Public Sources	
Renewable	35% Renew/EE	50% Carbon Reduction by 2030
Gas Price	EIA Forecast	200%
Retirement	DTE Plan	Adjust tier 2 early
Demand Response	2017 State of MI Potential Study	
Available Replacement		

The DTE Reference Case[1] will also be run, incorporating the 2018 DTE corporate views on the input assumptions

	Base	Sensitivities
Load Growth	DTE Forecast	High, High Electric Vehicle Penetration
EWR	1.5% per year – 2018 potential study	1.75%, 2.0%, 2.25%, 2.5%
Capital Cost	Public Sources	DTE CCGT cost
Renewable	50% Clean Energy Goal (renewable & EWR)	
Gas Price	DTE Reference case	
Retirement	DTE Plan	Adjust tier 2 early
Demand Response	DTE Current Plan	Full amount from 2017 State of MI Potential Study (low case)
Distributed renewables	PURPA Renewed	+300 MW

1. The DTE Reference Case is subject to change

We are inviting each stakeholder organization to submit an additional sensitivity to be run on one of the four IRP scenarios presented

- Each stakeholder organization will have the opportunity to submit one sensitivity for DTE to run

- Company discretion will be used when determining which sensitivities to run. DTE Electric's objective is to show the diversity of thought across the stakeholder realm. Some sensitivities may be combined with other like sensitivities

- Process for submitting sensitivities for consideration:
    1. Must be submitted by **July 31, 2018** to DTE_2019_IRP@dteenergy.com. One submission per stakeholder organization. Note this email account will only be monitored after July 31, for scenario clarification purposes
    2. Specify which single scenario is the best fit for the sensitivity
    3. Sensitivity must have quantifiable inputs – specific years, specific costs, specific levels tied to sources
    4. Must be submitted in excel format with formulas included if applicable
    5. Provide follow-up contact information in case of clarification is needed
    6. Stakeholder sensitivities will be discussed at the September technical workshop

An example of an adequate sensitivity submission is presented below

Desire to test lower Combined Heat and Power Capital Costs based on XXX source and XXX source

For the CHP technology, update the following assumptions and run option as a sensitivity:

1. Lower the capital cost by 25% from the Base
2. In addition, lower the escalation rate from the Base rate (2.1-2.3%) to 1.5% for this low CHP cost sensitivity

EIA Base	Base	Sensitivity	Sensitivity
Overnight Cost 2017 ($/kW)	Escalation Rate	Overnight Cost 2017 ($/kW)	Escalation Rate
$875	base	$656	1.015

2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
$656	$666	$676	$686	$697	$707	$718	$728	$739	$750	$762	$773	$785	$796

2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
$808	$820	$833	$845	$858	$871	$884	$897	$911	$924

- Sources are not specifically required, however, publicly available documentation supporting the inputs will lend more credence to the sensitivity in the final risk weighting of the probability of occurrence of the sensitivity
- Sources that are up to date, based on relevant geography, and issued by recognized entities will be weighted accordingly

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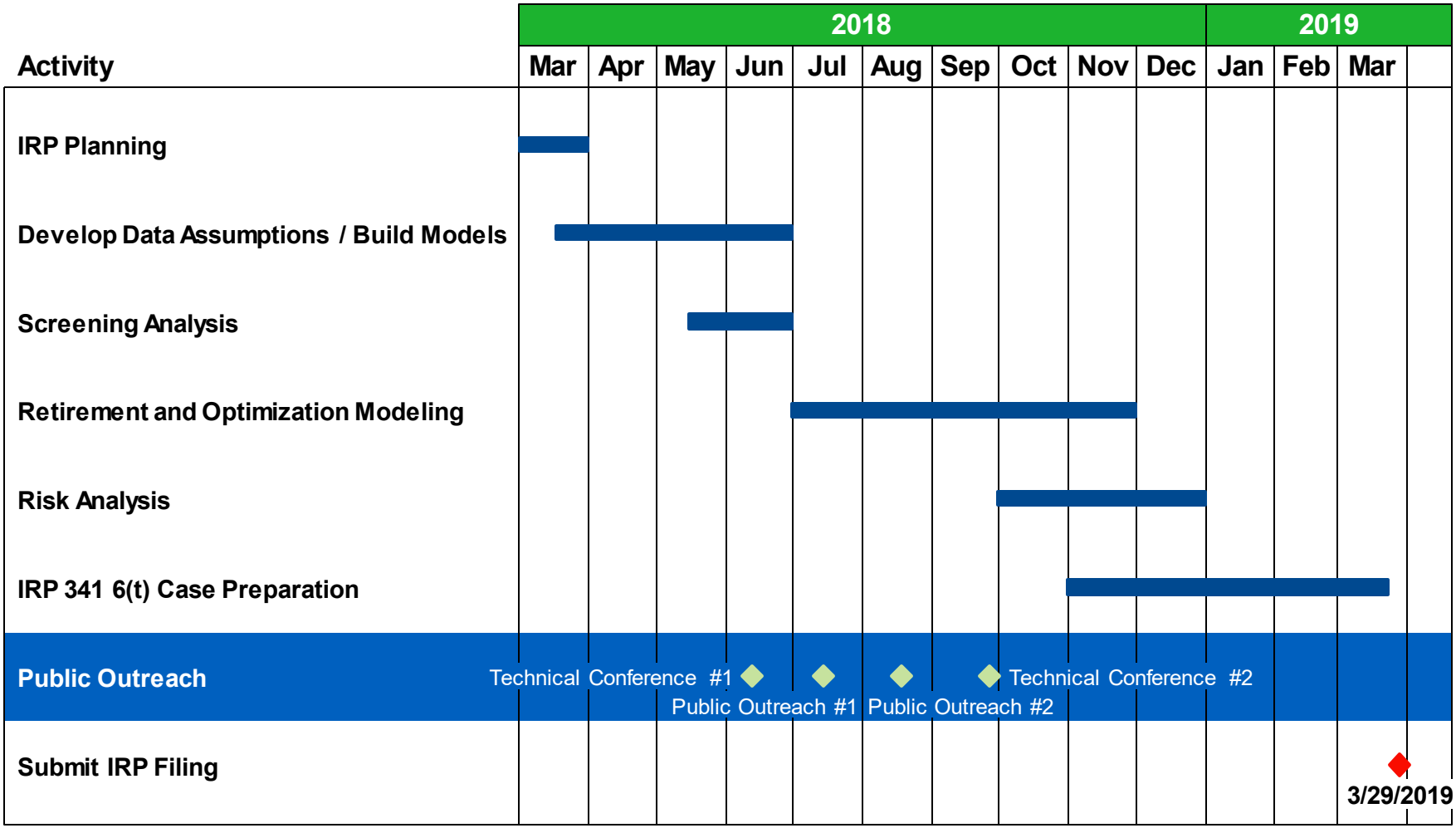
There are various activities scheduled to satisfy the requirements and file the IRP by March 29, 2019



Break

DTE Energy

Questions on Presentation

Stakeholder Comments on IRP Process

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Closing Remarks