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RENEWABLE ENERGY

Panel Session: Utility Perspective

Introduction to the Panel

Moderator: Bruce Hedman, Coordinator, Packaged CHP Accelerator

Q & A will occur at the end of session
Questions for Panel Members
Please use chat function to Bruce Hedman

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The Panel – Utility Perspective

BGE
An Exelon Company

James Libertini
Product Manager

James Libertini is a Product Manager for Baltimore Gas & Electric. His other roles have included Project Manager /Account Executive for Constellation's Project and Services Group concentrating in Sales and Project Management. James focuses on helping commercial and industrial customers design and implement energy saving CHP strategies, helping customers reduce energy consumption, decrease their carbon footprint and minimize investment expense to achieve these results. James is a Graduate of Towson University with a Bachelor's of Science Degree in Environmental Planning.

DTE

James Leidel
DTE Energy

James Leidel is a Principal Markets Technical Consultant at DTE Energy, working in the Gas Major Accounts group. He has been involved in the energy and energy management industries since his graduation in 1990 from Purdue University in mechanical engineering. He has worked in building energy management contracting, at a public university as Energy Manager, in academics in Clean Energy research, and now as an engineer with a large Midwest combined gas/electric utility focusing on CHP. James has experience in CHP, HVAC, solar, wind, biomass and many green building technologies.

DUKE ENERGY

Zachary Kuznar
Duke Energy

Zachary Kuznar is the Managing Director of Distributed Generation Business Development for Duke Energy. In this role Zak leads a team responsible for developing and executing the strategy to create an investment portfolio for CHP, energy storage, distributed solar assets and microgrids for all of Duke Energy's regulated companies. Previously he worked in the Emerging Technology Office focusing on identifying, developing, testing and deploying technologies in the renewable generation, energy storage, and water reuse and reclamation space for both the regulated and commercial businesses. Prior to joining Duke, Zak worked in the Advanced Materials division of General Electric. He has an undergraduate degree in Chemical Engineering from Purdue University, and a PhD in Chemical and Environmental Engineering from Yale University.

BGE SMART ENERGY savers PROGRAM®

BGE Smart Energy Savers Program®

Combined Heat & Power Program

September 8, 2020

BGE
An Exelon Company

EmPOWER MARYLAND

Agenda

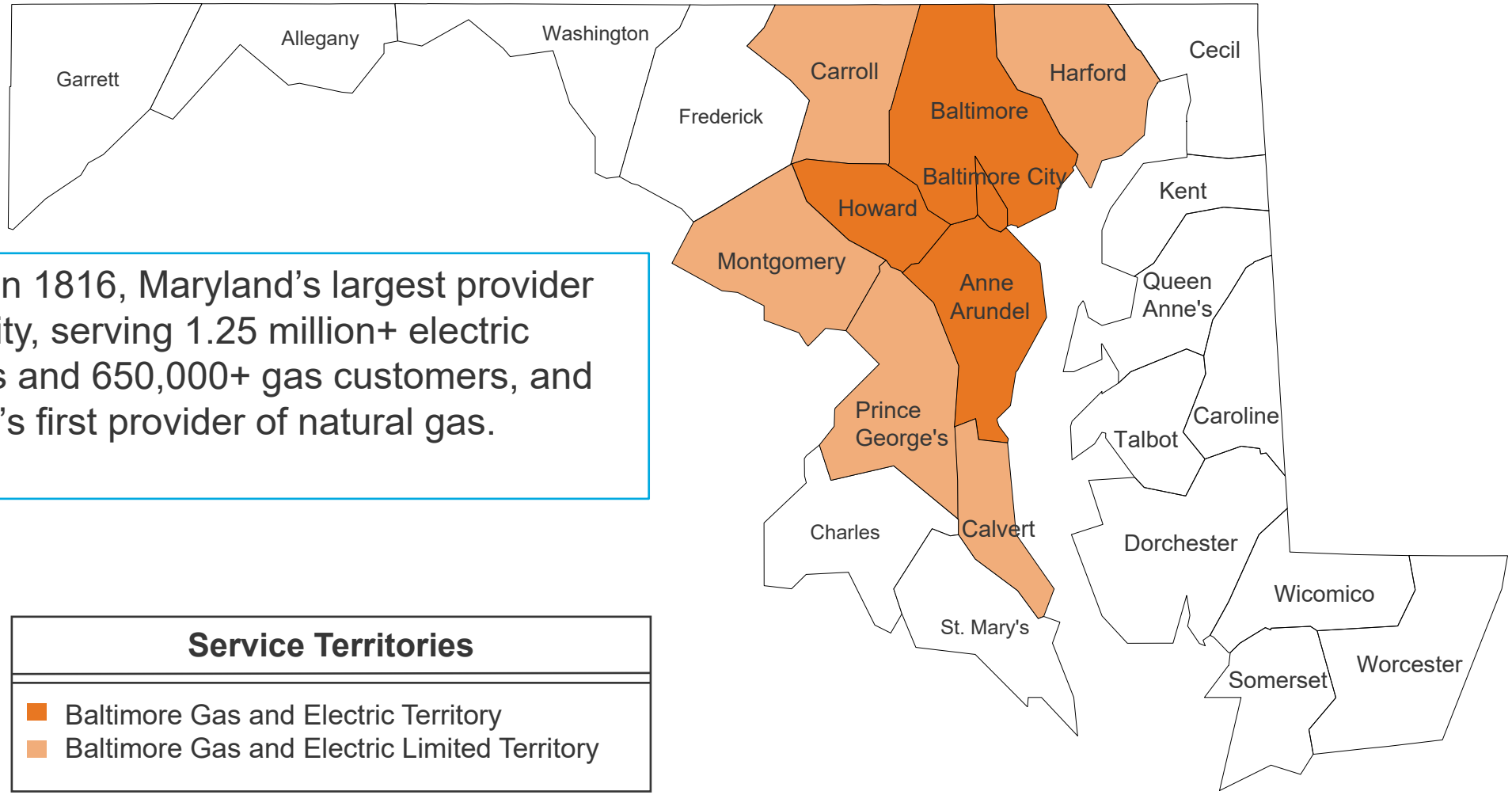
BGE SMART ENERGY savers PROGRAM

1. BGE
2. EmPOWER Maryland
3. CHP Program Overview
4. Program Challenges
5. Path to Success/Case Study

BGE – Maryland's Largest Gas & Electric Utility

BGE SMART ENERGY savers PROGRAM

- Founded in 1816, Maryland's largest provider of electricity, serving 1.25 million+ electric customers and 650,000+ gas customers, and the nation's first provider of natural gas.



Service Territories

- Baltimore Gas and Electric Territory
- Baltimore Gas and Electric Limited Territory

BGE An Exelon Company

EmPOWER MARYLAND

EmPOWER Maryland

BGE SMARTENERGY savers PROGRAM

In 2008…

A portfolio of energy efficiency programs was established to support the EMPOWER Maryland initiative of reducing consumption in the state by 15% per capita by 2015.

In 2015…

The 15% reduction goal was achieved!

Since 2015…

Utilities continue to work towards achieving an annual every savings of 2%.

The ratepayer-funded program is making it easier to upgrade to energy-efficient equipment, resulting in energy savings year after year.

2008

EmPOWER Maryland Act passed by the MD General Assembly

2012

Launched Combined Heat and Power Program

2015

Reduction goal achieved and Public Service Commission continues program

2017

Maryland legislature extended EmPOWER law

2018 – 2020

Program cycle budgets and portfolios approved

BGE An Exelon Company

EmPOWER MARYLAND

Program Overview

BGE SMARTENERGY savers PROGRAM

Incentive Structure

- ≤ 1 MW $1,200/kW
- > 1MW $900/kW

65% HHV, 100% on-site use

Payment Timing

- 10% Design – Completed drawings and permits
- 30% Commissioning – Subject to inspection
- 60% Production – 12 contiguous months, based on actual data vs. estimated

Technical Field Support
BGE's "secret ingredient "

Project Cap

- $2.5M maximum, one project/customer site/3-year program cycle

Program Challenges

BGE SMARTENERGY savers PROGRAM

Technical obstacles
Gas availability, waste heat utilization, electric interconnect, standby service, O&M, etc.

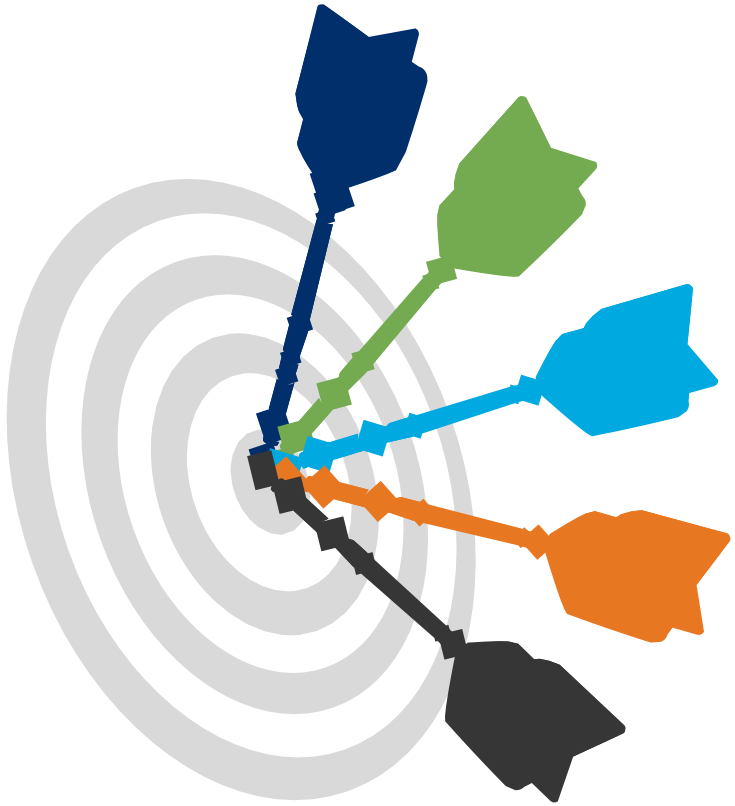
Educating customers
Engaging successfully at all levels of an organization, from maintenance staff to the C suite.

High initial cost
Initial investment can be expensive and often not budgeted.

Diverse customer segments
Broad offering and technical support for all customer types

Focusing too much on financials
Customer sustainability goals and resilience needs are often more important.

Path to Success



1.) Dedicated Technical Field Support

2.) Third-party liaisons (i.e. MEA and DOE)

3.) Emphasize GHG reduction / decarbonization

4.) Increase incentives for smaller systems

5.) Customized relationship building outreach to customers

Columbia Association

Health

BGE SMARTENERGY savers PROGRAM

Savings at a Glance

Estimated Annual Energy Savings
416,000 kWh/year

Estimated Annual Cost Savings
$25,000/year

Incentives Paid
$60,000

"Through our research, we found that a CHP system would be a cost effective and impactful project. The payback was good. It was a no-brainer to move forward on it."

– Jeremy Scharfenberg | Energy Manager | Columbia Association

Contact Info

Jim Libertini – Product Manager

BGE Smart Energy Savers Program

Baltimore Gas and Electric

- jim.libertini@bge.com
- (410) 470-0433
- BGEsmartenergy.com/business/business-programs/chp

DTE

CHP Value to a Dual Utility

(and a net zero carbon future)

James Leidel, DTE Energy
Gas Major Accounts
September 2020

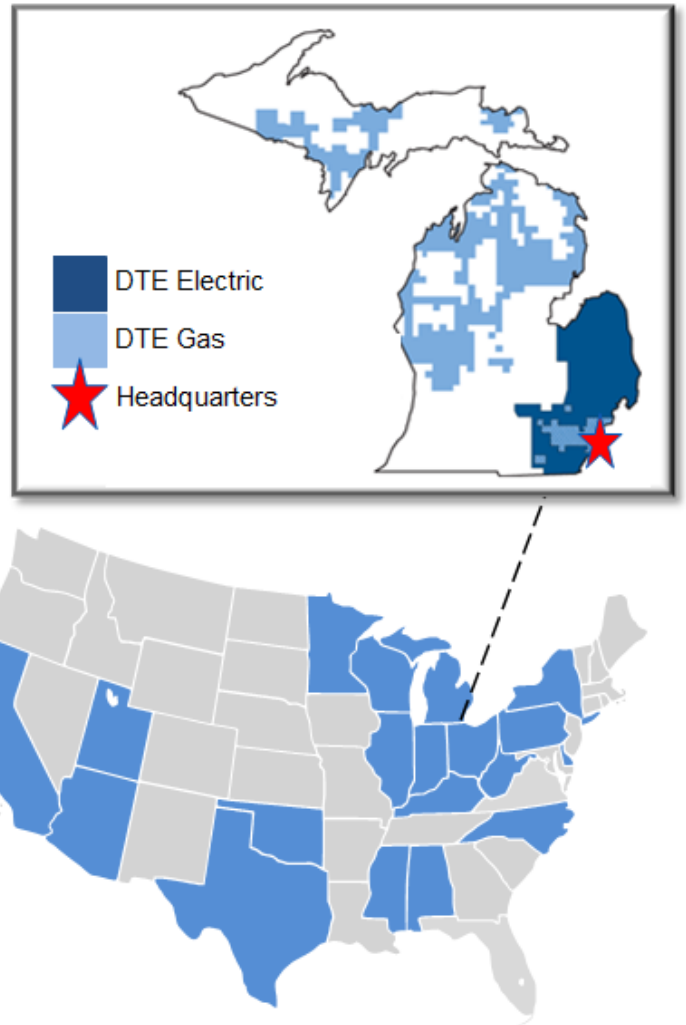
U.S. DEPARTMENT OF ENERGY
Energy Efficiency & Renewable Energy

Outline

- Who is DTE?
  - DTE Electric net zero carbon (NZC) commitment, Sept 2019
  - DTE Gas NZC commitment, June 2020
- DTE Gas CHP activities
- Value of CHP to a dual utility: example
- Renewable gas provides a path to NZC CHP

Who is DTE Energy?

DTE Energy is a Fortune 300 company with deep Michigan roots



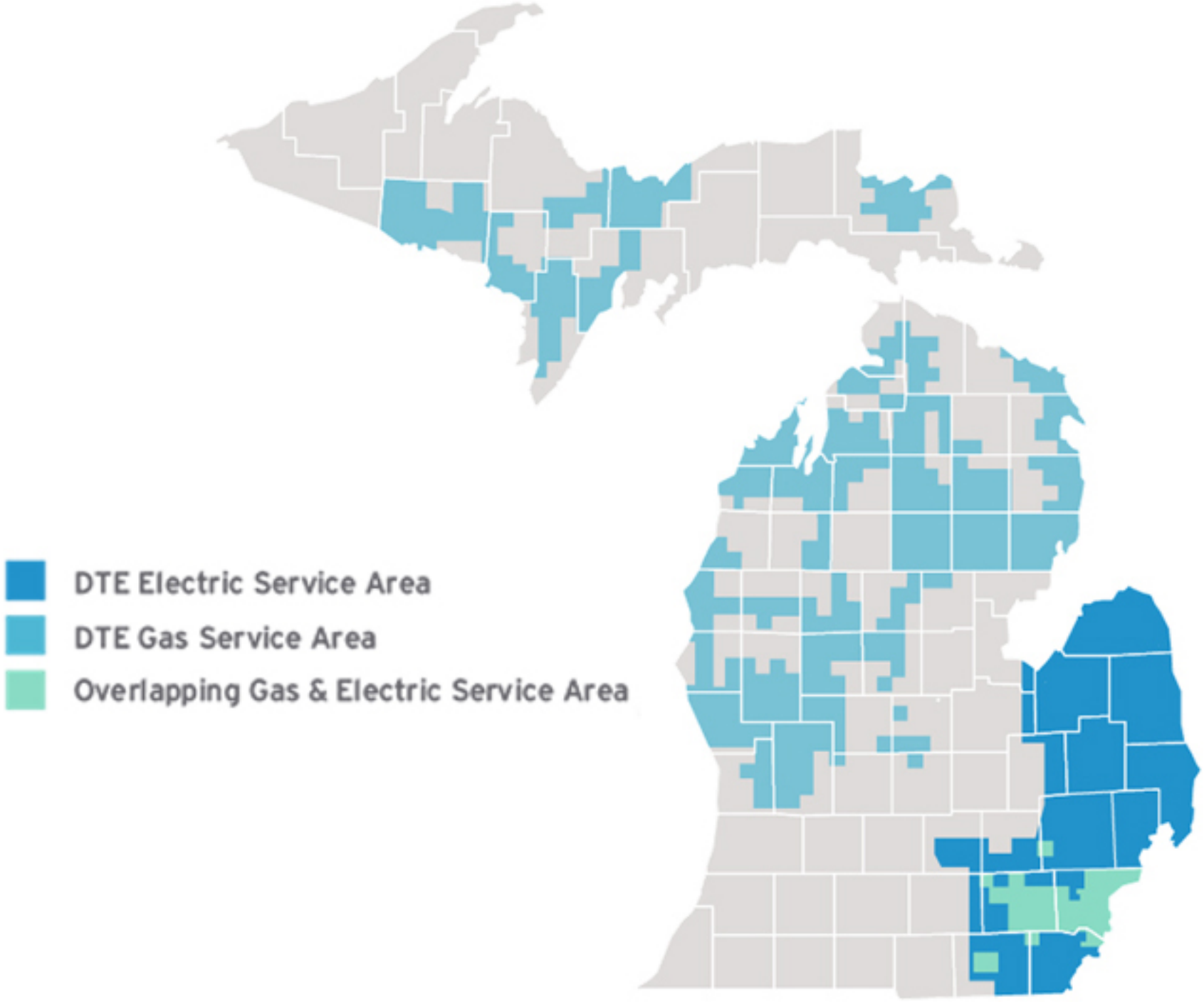
Our Business

- Market cap ~$18 billion
- Two fully regulated utilities serving Michigan
  - Founded in 1849, **DTE Gas**
  - Founded in 1886, **DTE Electric**
- Non-utility businesses operate in 19 states

Michigan Strength

- Top tier regulatory environment supports utility investment
- Constructive energy legislation supports transition to cleaner energy
- Strong state and local economy provides avenue for growth

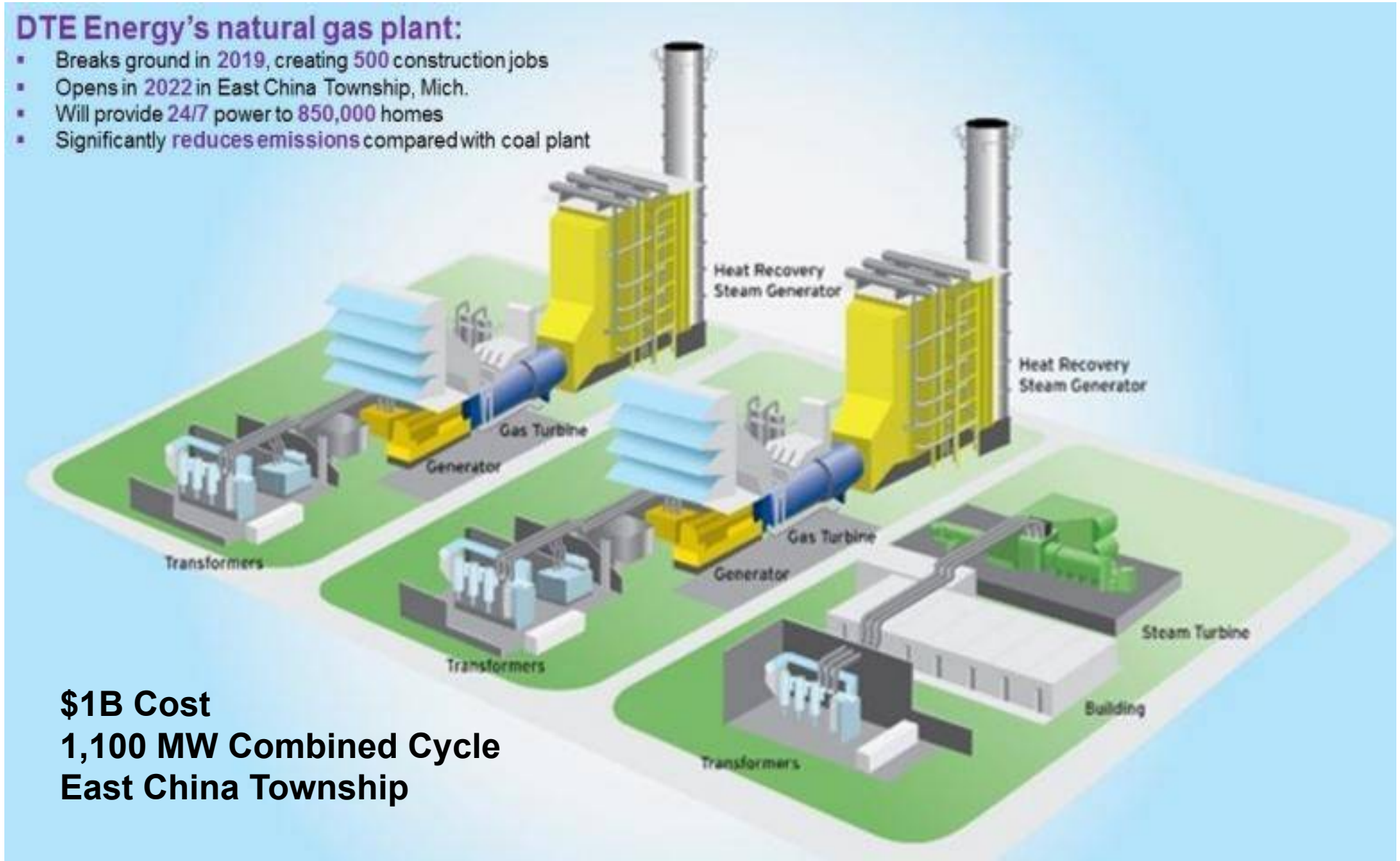
DTE


DTE Electric Service Area
DTE Gas Service Area
Overlapping Gas & Electric Service Area


Flint
London
Lansing
Chatham-Kent
Detroit
Ann Arbor
Dearborn
Battle Creek
Lake Erie
Toledo
Cleveland
Akron
Canton
Youngsto
69
75
96
402
401
90
275
480
76
71
New NEXUS
Gas Pipeline
1.5 billion cubic feet per day

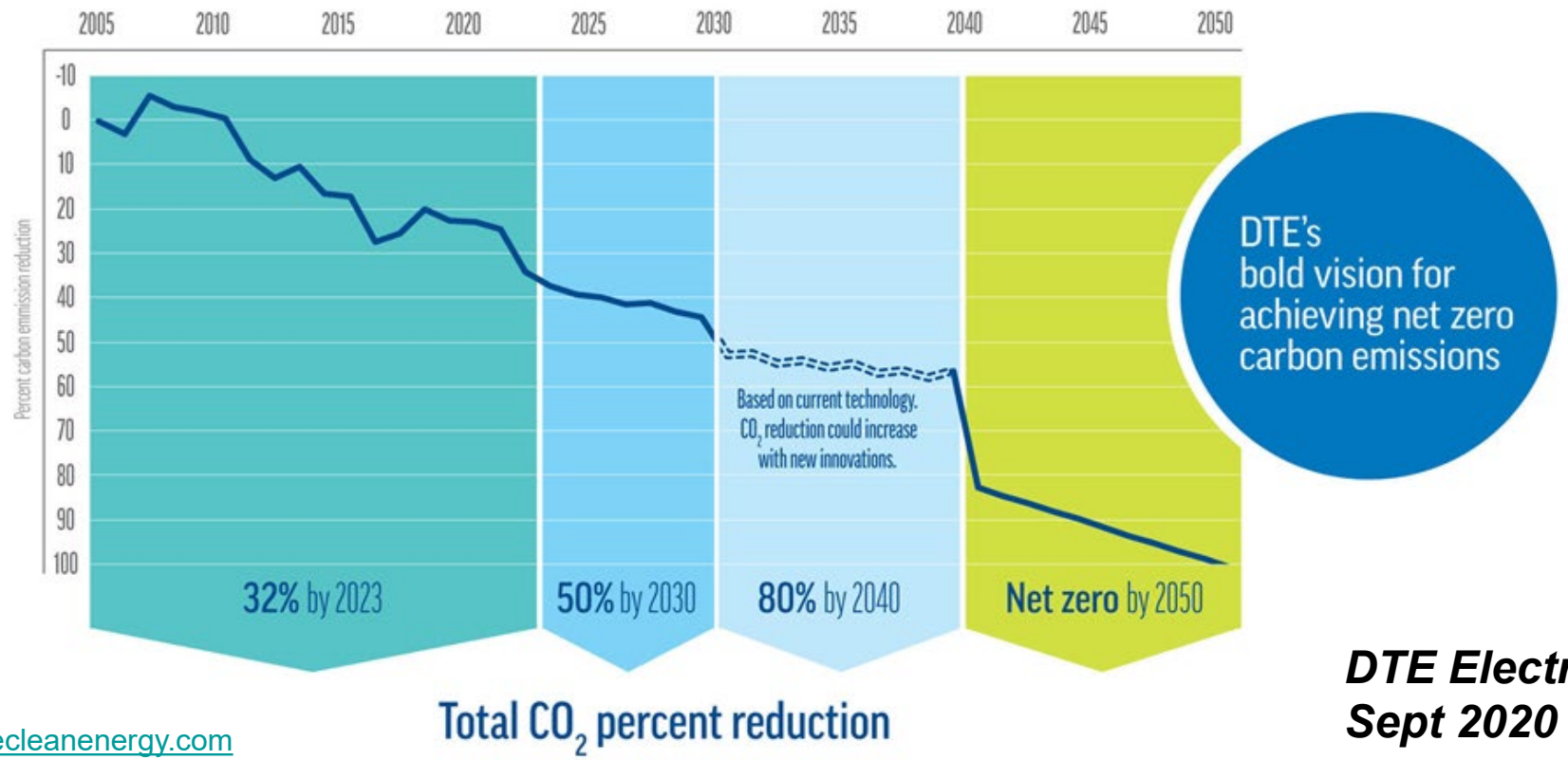

Flint
London
Lansing
Chatham-Kent
Detroit
Ann Arbor
Dearborn
Battle Creek
Toledo
Cleveland
Akron
Canton
Lake Erie
New 1,100MW
Gas Plant
New NEXUS
Gas Pipeline
1.5 billion cubic feet per day

Blue Water combined-cycle power plant will provide new, lower carbon base-load generation



Powering toward a net zero carbon future

Our goals and progress to date



https://dtecleanenergy.com

DTE Electric
Sept 2020

“Climate change is one of the defining public policy issues of our time and it demands a bold response. The level of impact urgently needed can only be achieved by viewing the challenge through a holistic lens, bringing our suppliers and our customers on the journey with us. This is the right plan for our environment, for our customers and for our communities.”

- Jerry Norcia, DTE CEO
June 2020

DTE

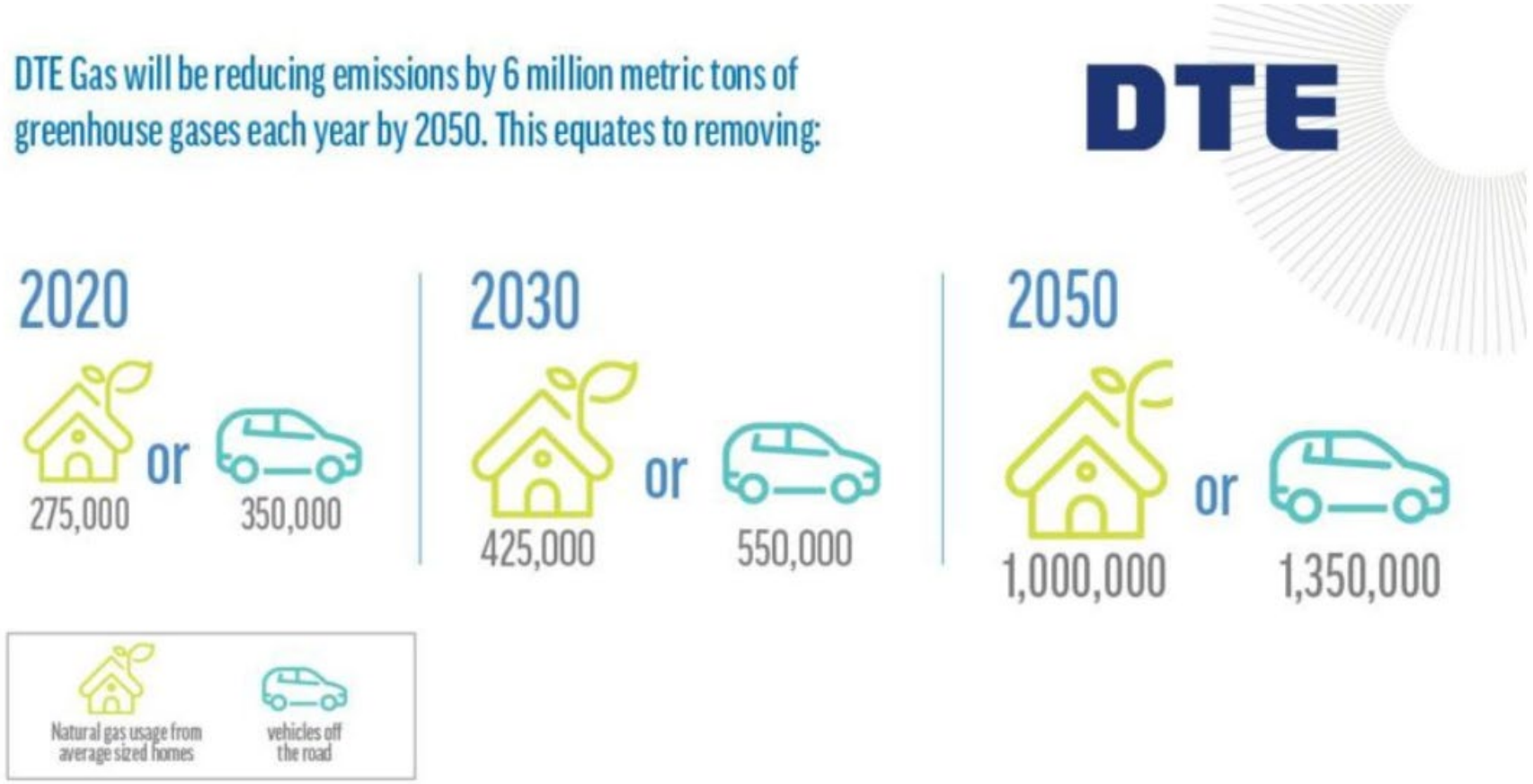
DTE https://empoweringmichigan.com/working-together-toward-a-cleaner-energy-future/

DTE Gas – June 2020

Press Release

Working together toward a cleaner energy future

by RoNeishaMullen | Jun 24, 2020



Today DTE Gas announced an innovative new plan to build an even cleaner energy future for Michiganders, all while providing safe, reliable and affordable energy.

With our customers and suppliers, we'll reduce greenhouse gas emissions from residential and small business customers by 6 million metric tons annually – the equivalent of removing 1.3

CHP can help serve these missions

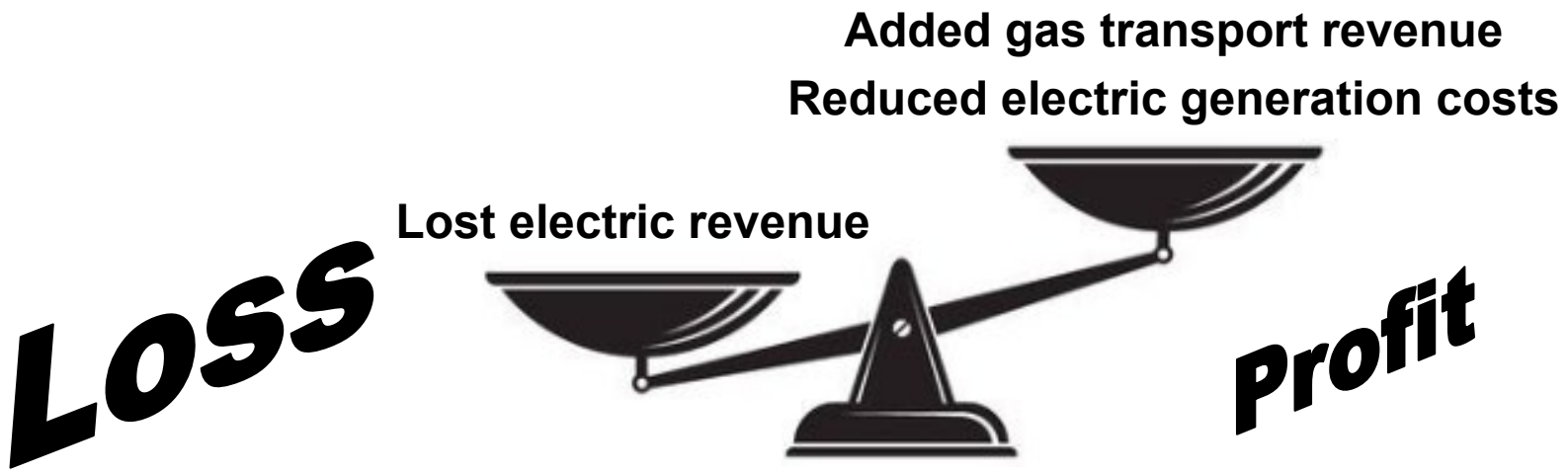
- CHP can reduce Midwest USA customers carbon by ~40%. *TODAY*
- DTE Gas Major Accounts Activities
  - CHP workshops
  - Lunch ‘n learns with A&E firms
  - CHP studies

DTE

Net Value of CHP to a Dual Utility

<u>Example of Large Customer CHP Project</u>

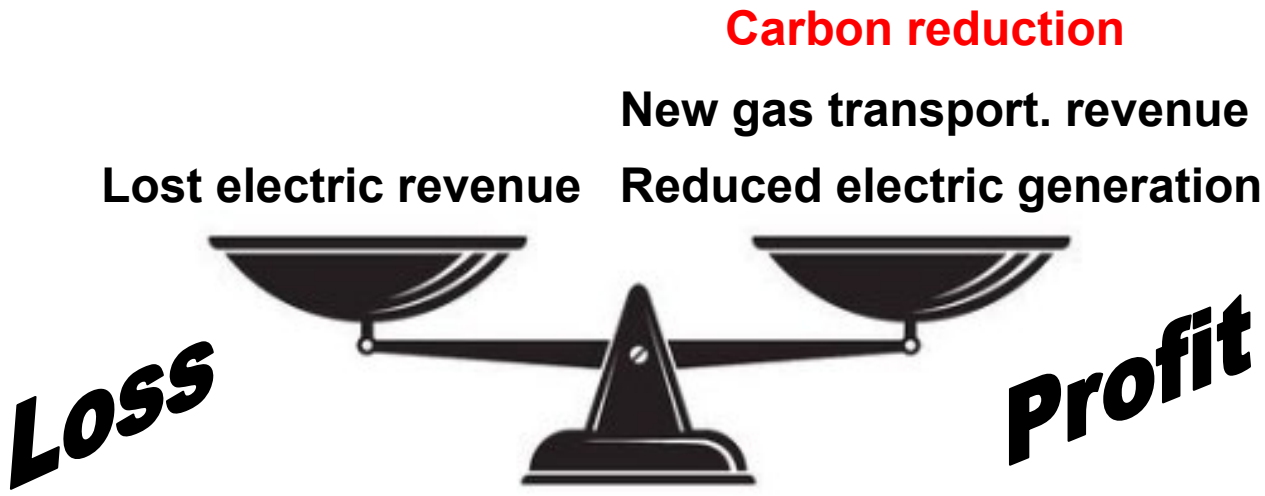
- Lost electric revenue & reduced electric generation cost
- Gained gas transport revenue *(gas commodity by others)*



Net Value of CHP to a Dual Utility

Example of Large Customer CHP Project

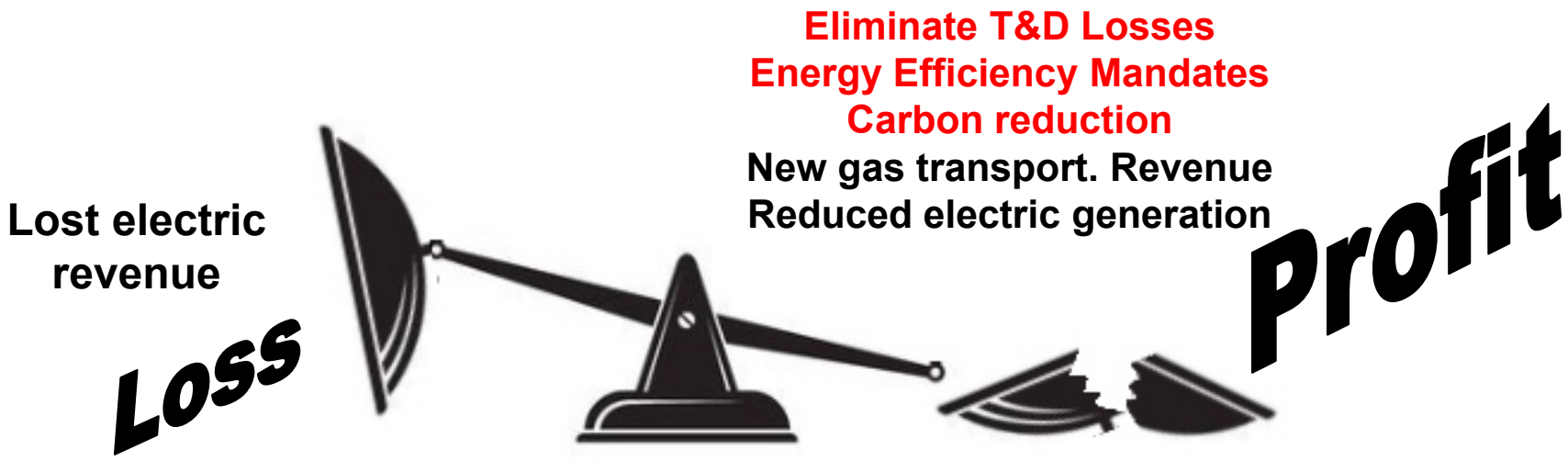
- Lost electric revenue & reduced electric generation cost
- Gained gas transport revenue *(gas commodity by others)*
- Other value streams
  - Carbon reduction (at $60 / ton CO2)



Net Value of CHP to a Dual Utility

Example of Large Customer CHP Project

- Lost electric revenue & reduced electric generation cost
- Gained gas transport revenue *(gas commodity by others)*
- Other value streams
  - Carbon reductions (at $60 / ton CO2)
  - Eliminate electric T&D losses (5-10%)
  - “Non-wires” kW demand reduction for constrained substations
  - Fulfill 2% energy efficiency mandate (Michigan EWR program)



CHP is Not a "Stranded Asset"

Renewable Gas provides a Path to
Net Zero Carbon

DTE

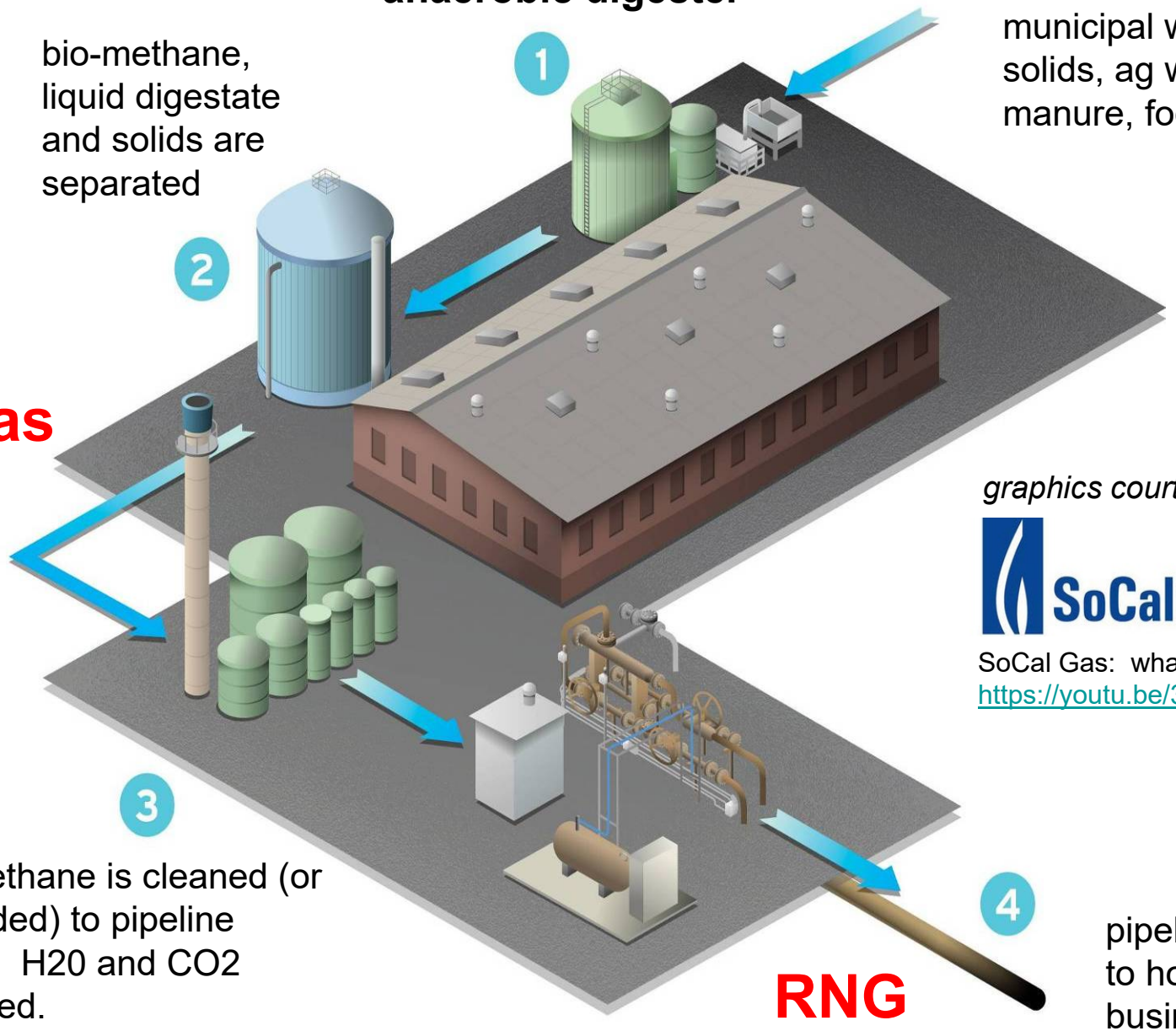
anaerobic digester

Organics

municipal waste water solids, ag wastes, manure, food wastes

bio-methane, liquid digestate and solids are separated

BioGas



graphics courtesy of:

SoCalGas

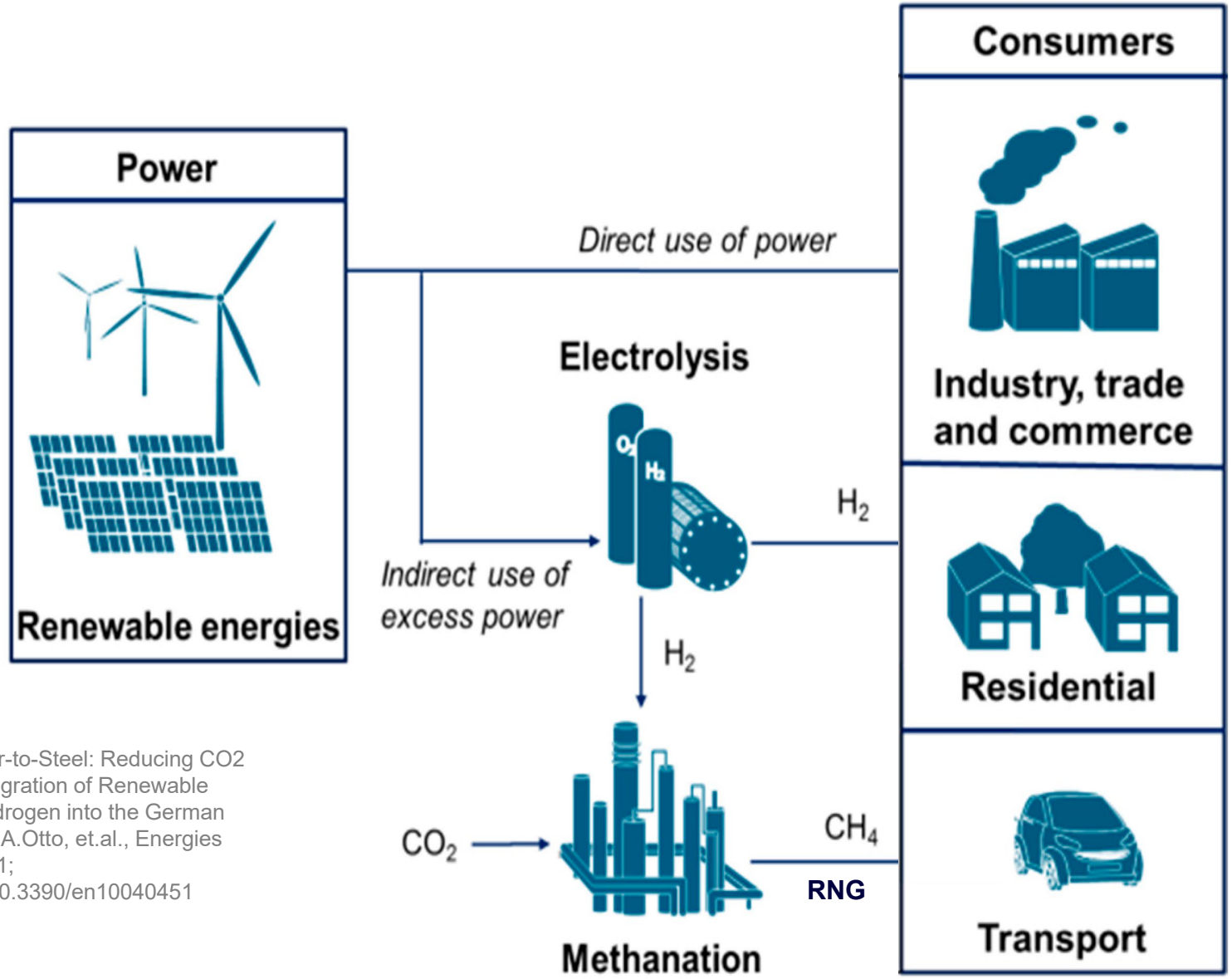
SoCal Gas: what is RNG?
https://youtu.be/3KaMnkmf0tc

bio-methane is cleaned (or upgraded) to pipeline specs. H20 and CO2 removed.

RNG

pipeline quality to homes & businesses

Power to Gas (P2G) = renewable hydrogen



Source: "Power-to-Steel: Reducing CO2 through the Integration of Renewable Energy and Hydrogen into the German Steel Industry", A.Otto, et.al., Energies 2017, 10(4), 451; https://doi.org/10.3390/en10040451

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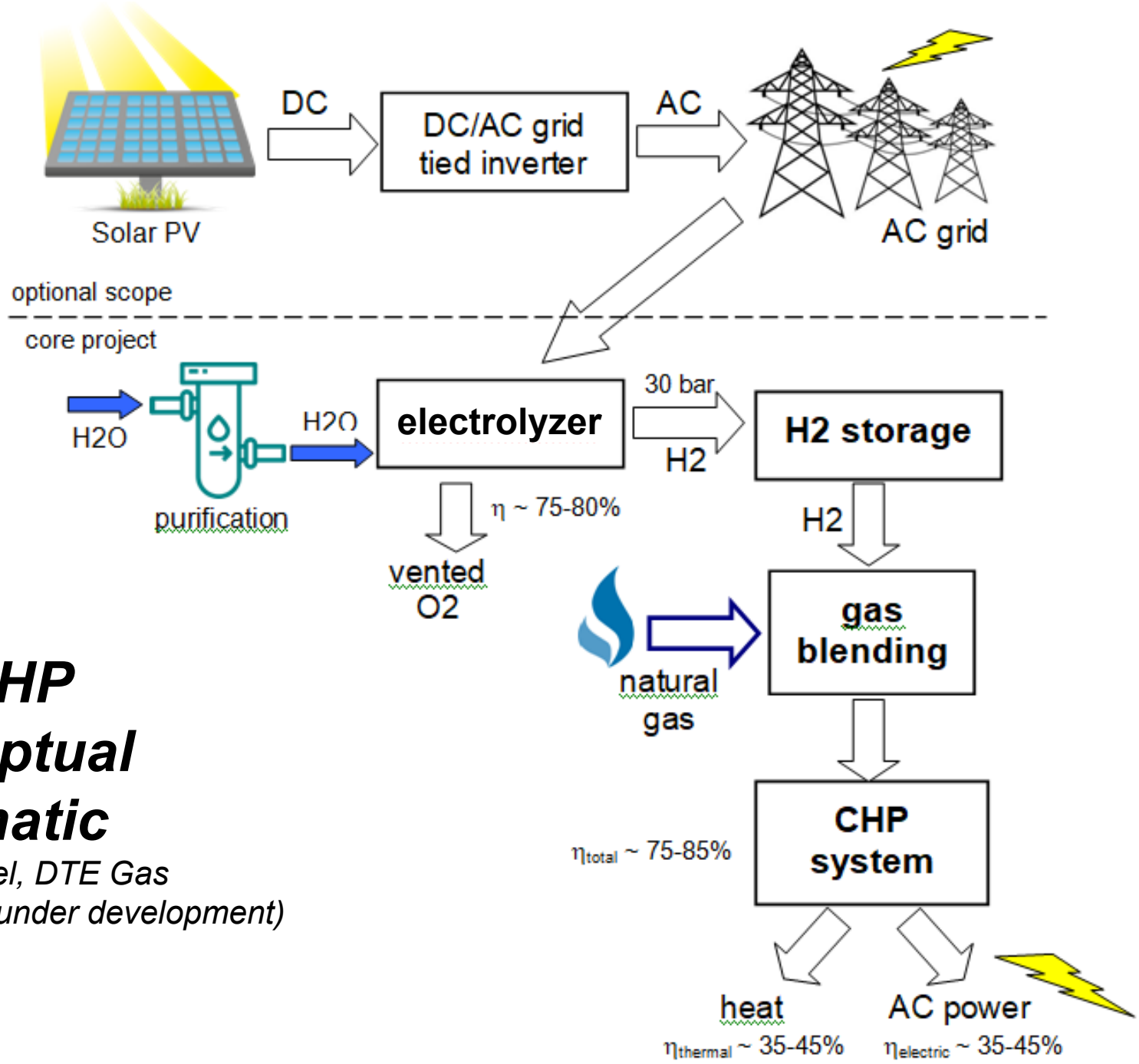


P2G CHP Conceptual Schematic

By Jim Leidel, DTE Gas
(a proposal under development)

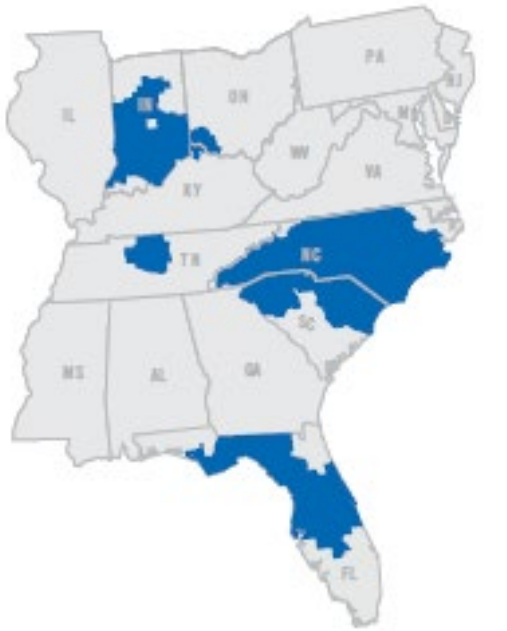
DTE

DOE Combined Heat and Power Virtual Workshop

Zak Kuznar, PhD
Managing Director, Duke Energy

Duke Energy

Electric and Gas Utilities Service Areas



Electric Utilities and Infrastructure (as of Dec. 31, 2018)

Duke Energy's Electric Utilities and Infrastructure unit operates primarily through the regulated utilities of Duke Energy Carolinas, Duke Energy Progress, Duke Energy Florida, Duke Energy Indiana and Duke Energy Ohio.

States	NC, SC, FL, IN, OH, KY
Service Area	95,000 square miles
Electric Generation Capacity (owned)	51,000 megawatts
Electric Transmission Lines	31,000 miles
Electric Distribution Lines	280,000 miles
Total Electric Retail Customers	**7.7 million**
North Carolina	3.4 million
South Carolina	760,000
Ohio/Kentucky	860,000
Indiana	840,000
Florida	1.8 million

Duke Energy Renewables (as of Dec. 31, 2018)

Duke Energy Renewables, a nonregulated unit of Duke Energy, operates wind and solar power facilities in 14 states.

States	AZ, CA, CO, FL, GA, HI, KS, NC, NY, OK, PA, TX, WI, WY
Electric Generation Capacity	3,000 megawatts

Clemson University Combined Heat and Power Facility

- 14 MW
- Commercial Operation Date – 12/19
- Owned and operated by Duke Energy Carolina's
- All steam is sold to Clemson University
- Facility can also island the campus to provide back-up power

Purdue University Combined Heat and Power Facility

- 15 MW Gas Turbine
- Located on the Purdue University Campus in West Lafayette, IN
- Owned and operated by Duke Energy Indiana
- All steam is sold to Purdue University
- Facility will also be able to island the campus during a grid outage
- Under construction – COD Q1 2022

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