

Energy Career and Leadership Webinar Series – Spring 2024

From Raising Cows to Removing Carbon: A Personal Sustainability Journey

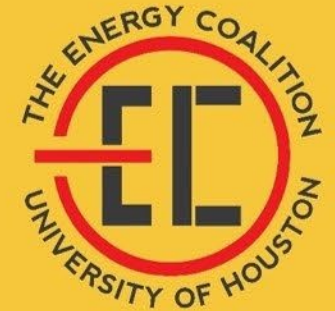
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TEXAS INDUSTRIAL ENERGY
EFFICIENCY PROGRAM



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From Raising Cows to Removing Carbon: A Personal Sustainability Journey



Alan Rossiter

Executive Director, External
Relations & Educational Program
Development

UH Energy, University of Houston

From Raising Cows to Removing Carbon: A Personal Sustainability Journey

Confirmed Presenters



Rey Banatao, Ph.D. Director / Project Lead, X (formerly Google X)

Presentation Topic: Fall in Love with the Problem - Lessons in Moonshot Taking, Climate and Entrepreneurship

Don Victory. Founder and Chair of Energy Mentors; previously Upstream Chief Process Engineer at ExxonMobil

Presentation Topic: Defeating Career Anxiety



Dates: **Fridays February 9 - March 29, 2024 (excluding March 8 & 15)**

Time: **10am - 11am**

Location: **Webinar Series**



Sharon Nolen. Eastman Fellow; leader of Eastman's Global Natural Resource Management program.

Presentation Topic: From Raising Cows to Removing Carbon: A Personal Sustainability Journey

Jane Stricker. SVP and Executive Director, Houston Energy Transition Initiative (HETI), The Greater Houston Partnership.

Presentation Topic: Navigating a Successful Career in a Changing



Energy Industry

Sindhu Balan. Investment principal, Chevron Technology Ventures (CTV).

Presentation Topic: Many Routes to a Career Destination

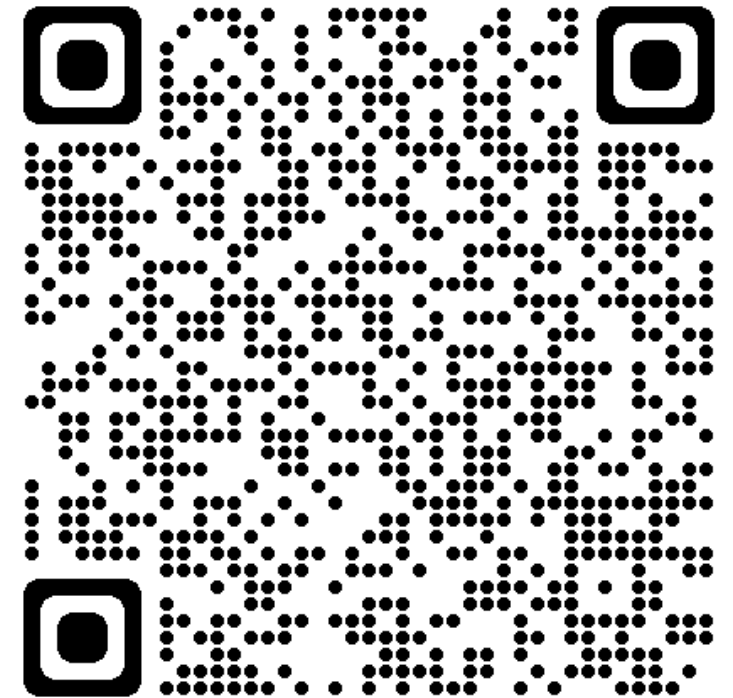


Additional Presenters to be announced soon.

Notes for Certificate Candidates

Open to students enrolled students at institutions of higher education. Registration must include institution & student ID.

1. Use your unique, personal Zoom link for the webinars.
2. Activate course in Canvas.
3. Participate in at least 4 webinars in real time.
4. Limited waivers available to use recordings. Must be requested in advance.
5. Complete each test by 11:59 pm the Thursday after the webinar. Passing grade: 80%





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Critical Issues in Energy 2023-24 Symposium Series
**THE GULF COAST HYDROGEN ECOSYSTEM:
OPPORTUNITIES & SOLUTIONS**

Wednesday, April 17, 2024

9:00AM - 5:00PM

UH Student Center South - Theater Room

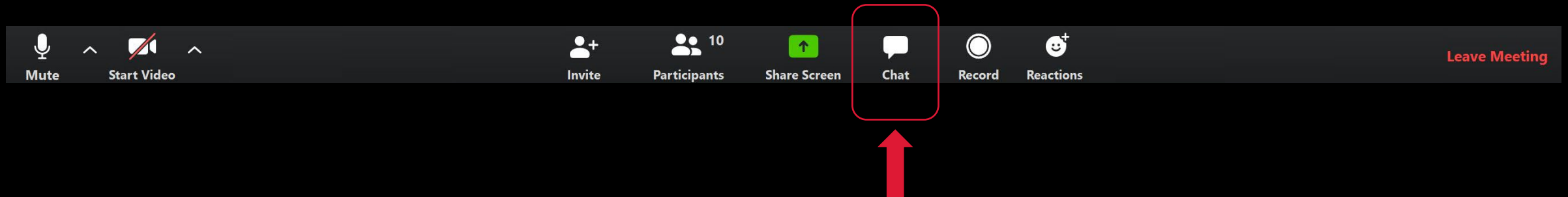
Reception and Dinner to Follow

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From Raising Cows to Removing Carbon: A Personal Sustainability Journey

Please stay muted with video off.
Submit your questions for our guest
speaker during the live Q&A using the
chat function in Zoom



From Raising Cows to Removing Carbon: A Personal Sustainability Journey

Today's Moderator

Uchenna B. Ubeh

*Vice-Chair / **UH Energy Coalition***

TEX-E Fellow



From Raising Cows to Removing Carbon: A Personal Sustainability Journey

OUR STORY

THE LARGEST ENERGY-FOCUSED STUDENT ORGANIZATION IN THE U.S.

8

COLLEGES

34

STUDENT ORGANIZATIONS

30

MAJORS



Upcoming Events

- Networking Event with Energy Professionals
- Career Readiness Sessions
- Crawfish Boil
- Hydrogen Symposium
- Banquet



From Raising Cows to Removing Carbon: A Personal Sustainability Journey



Sharon Nolen

Eastman Fellow

Leader, Global Natural Resource
Management Program

Eastman Chemical Company

From Raising Cows to Removing Carbon: A Personal Sustainability Journey



A legacy of innovation and growth



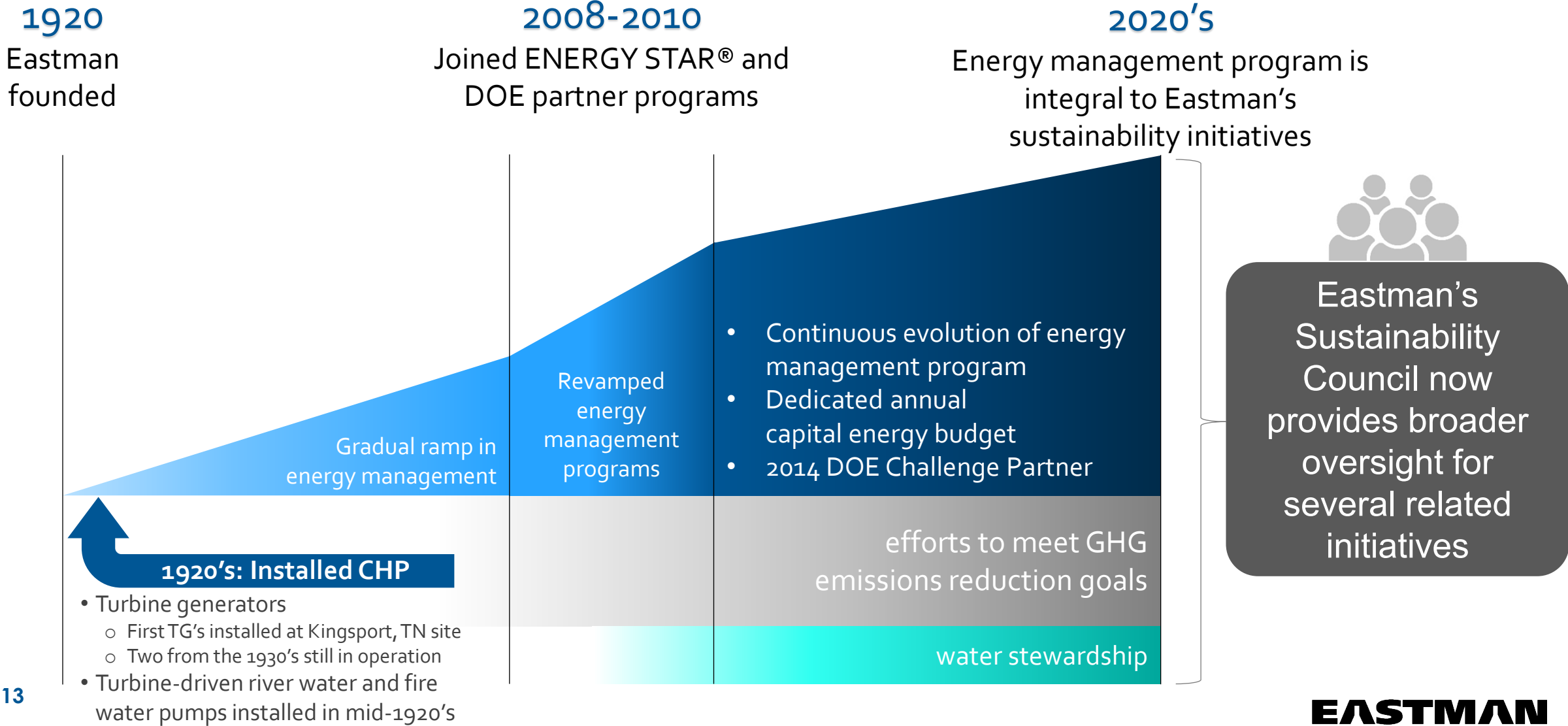
A legacy that began more than 100 years ago

"Throughout our history, Eastman men and women have focused their sense of purpose, innovative spirit and drive for excellence to enhance the quality of life in a material way."

- Mark Costa, Board Chair and CEO



History of energy efficiency at Eastman



Lessons Learned

- Help your neighbor
- Live within your means
- Be true to your values
- Plan for the future



Help Your Neighbor

- The drive to improve energy efficiency led Eastman to join two external programs that have industrial focus groups
- These programs offer many benefits and resources to help companies reduce energy use
- Both government programs have partnerships which include our suppliers and customers
- We benefit and contribute to these relationships
 - GM showed us water conservation projects
 - We shared energy management program with others



Live within your means: use less!

➤ When Eastman reset their energy program in 2010:

- No capital energy budget existed
- Ideas to improve efficiency existed in manufacturing, but those ideas were competing against everything else

➤ How did we get approval for a capital budget?

- Collected energy efficiency projects with good returns that had not received funding
- Presented a portfolio of these projects, ranked by internal rate of return (IRR) to the Executive Steering Committee



Be true to your values

➤ Components of Eastman's award-winning energy program existed in previous efforts

- Full time energy manager
- Capital budget

➤ The priority of the energy effort shifted with energy costs

➤ Maintaining a consistent program

- External commitments
- Sustainability reporting



Plan for the future

- Energy management system
- Capital energy budget became part of the base budget
- Standardized measures
- Tools to better monitor and optimize energy use
- Carbon price implementation
- Training and awareness activities
- Structured programs to maintain the gains



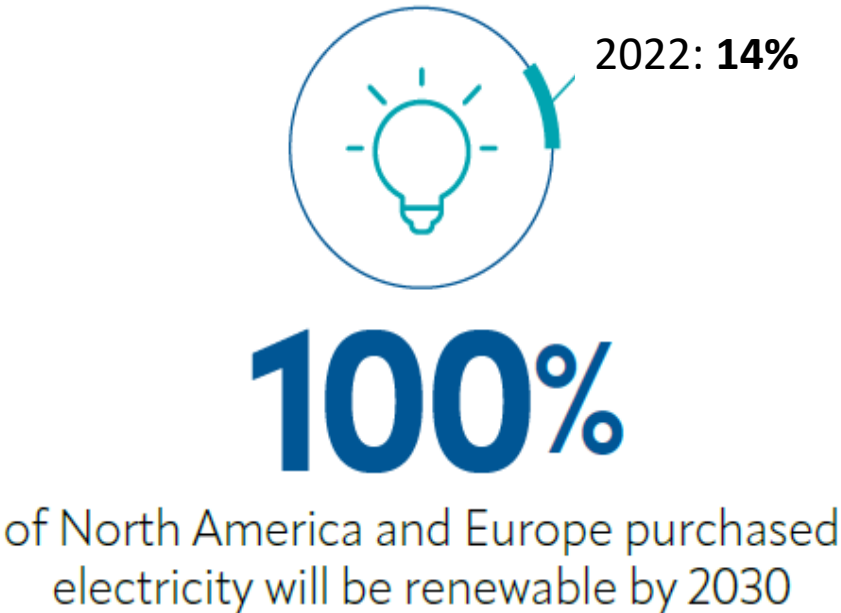
Mitigating climate change

Eastman will:

- Reduce our absolute GHG Scope 1 and 2 emissions by one-third by 2030 to **achieve carbon neutrality by 2050**
- Increase renewable energy use at Eastman so **100% of our purchased electricity in North America and Europe will be renewable by 2030**
- **Comprehensively understand our downstream Scope 3 footprint** and develop a strategy that addresses it
- Innovate to provide products that **enable energy savings and greenhouse gas reduction** down our value chains and at the consumer level



Progress on 2030 goals



Our path toward carbon neutrality

EASTMAN

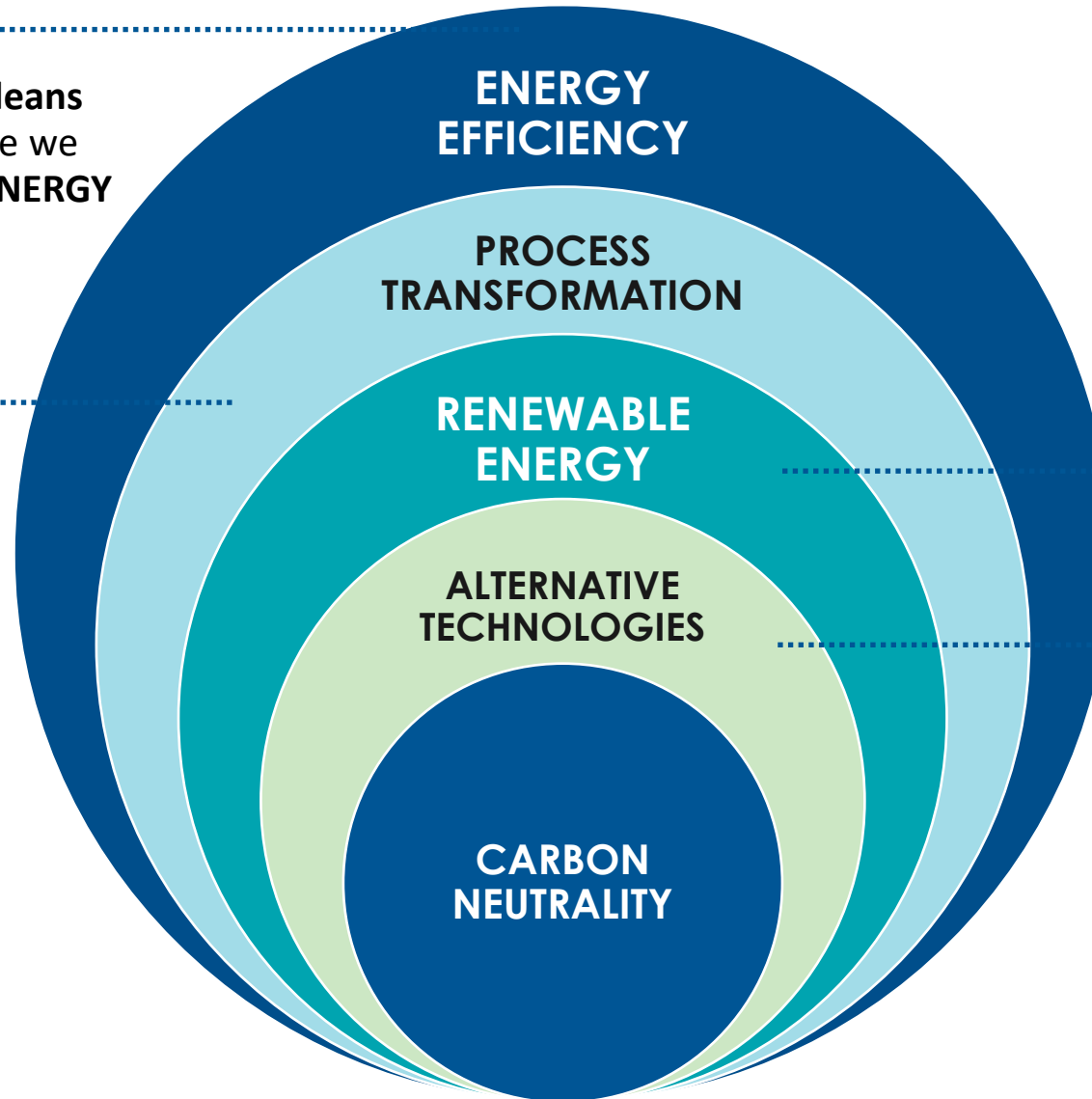
ENERGY EFFICIENCY

Eastman's climate progress today **leans heavily** on energy efficiency, where we have received multiple **DOE and ENERGY STAR®** awards.

PROCESS TRANSFORMATION

Our **molecular recycling technologies** produce new materials at a substantially reduced carbon footprint.

We will continue to identify and pursue additional enhancements to our manufacturing processes.



RENEWABLE ENERGY

By 2030, 100% of our purchased electricity in North America and Europe will be renewable.

ALTERNATIVE TECHNOLOGIES

We are exploring alternative energy technologies that have the **potential to accelerate** our progress toward decarbonization, such as:

- Clean hydrogen
- Carbon capture utilization & storage (CCUS)
- Other emerging innovations.

Energy efficiency is a top priority for experts in decarbonization, ensuring an efficient and credible transition to carbon neutral.

Industry experts put Energy Efficiency first

International Energy Agency:

It provides some of the **quickest and most cost-effective CO2 mitigation** options while lowering energy bills and strengthening energy security.¹

European Commission:

Energy Efficiency is the **first principle** to meet climate objectives.²

McKinsey:

EE is an **extremely attractive upfront investment** that pays for itself³

Department of Energy:

EE offers the **greatest opportunities for near-term decarbonization** solutions. In many cases, it **does not require major changes to industrial processes** and can bring immediate reductions in emissions.⁴

International Energy Agency:

Single **largest measure to avoid energy demand** in the Net Zero Emissions by 2050 Scenario and should be **front-loaded**¹

Eastman Case Studies further validate EE impact

Category	Annual Savings (\$M)	CO2 Reduction (kMT)	Investment (\$/mt CO2)
Dashboards	0.8	12	No capital cost
Distillation Columns	0.6	10	0.23
Column Packing	0.4	5	45
Thermo-compressors	0.19	22	50

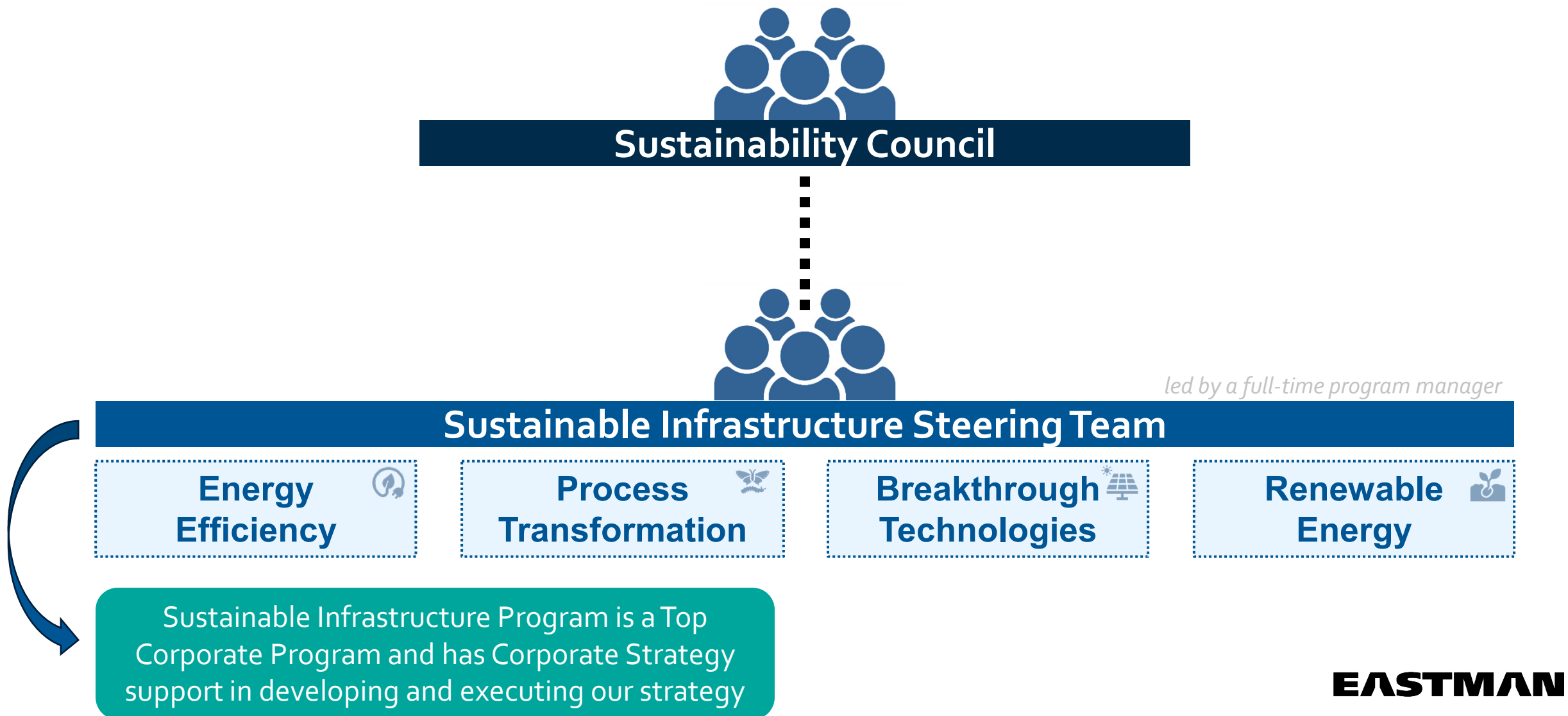
¹[Energy Efficiency](#)

²[Energy Efficiency First](#)

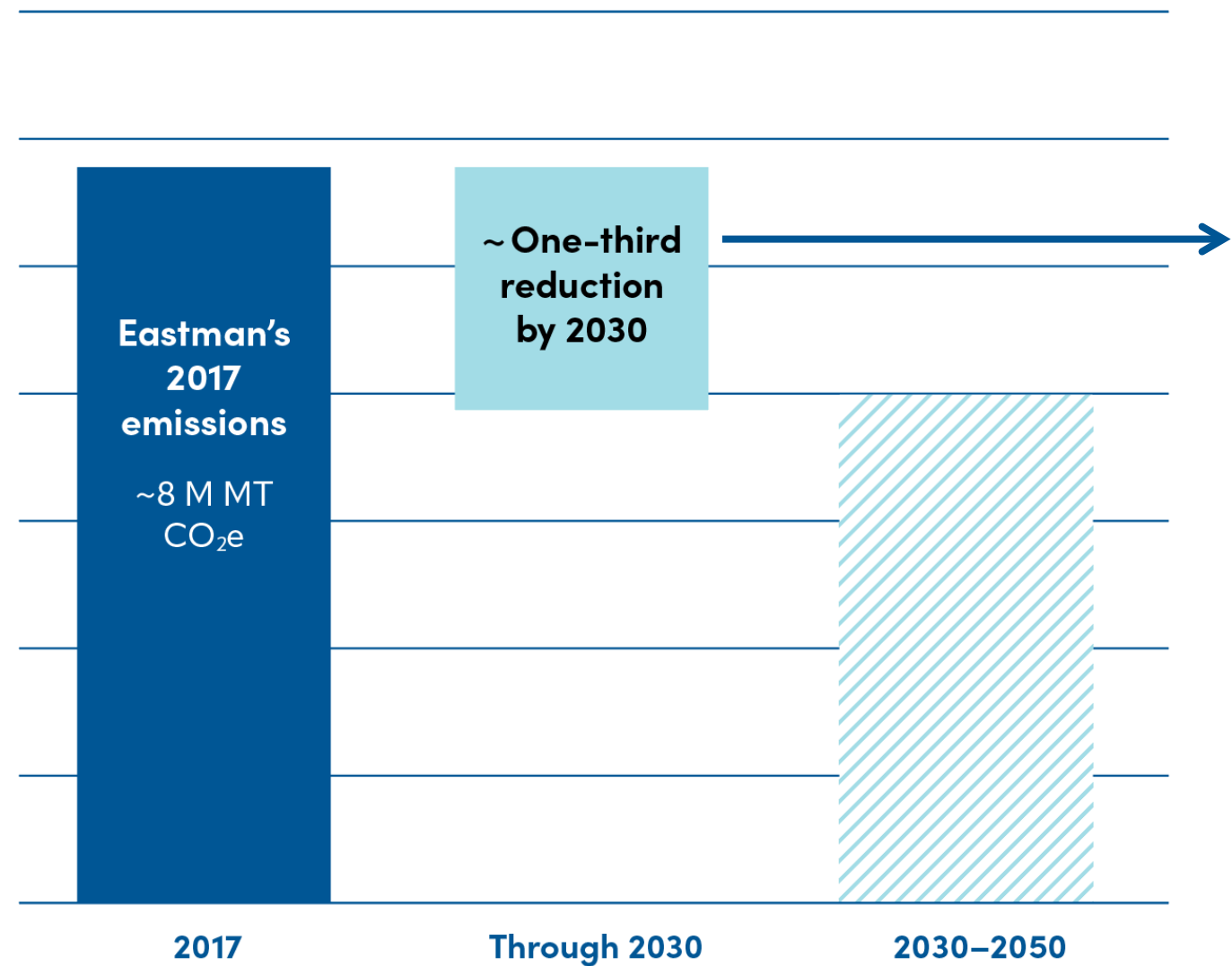
³[Energy Efficiency: A compelling global resource](#)

⁴[Industrial Decarbonization Roadmap](#)

Eastman's structure to address decarbonization



Clear action plans for carbon footprint reduction by 2030



Reduce One-Third of Scope 1 and 2 Carbon Emissions



Convert steam boilers



Optimize combined heat and power via advanced modeling



Relentless energy efficiency

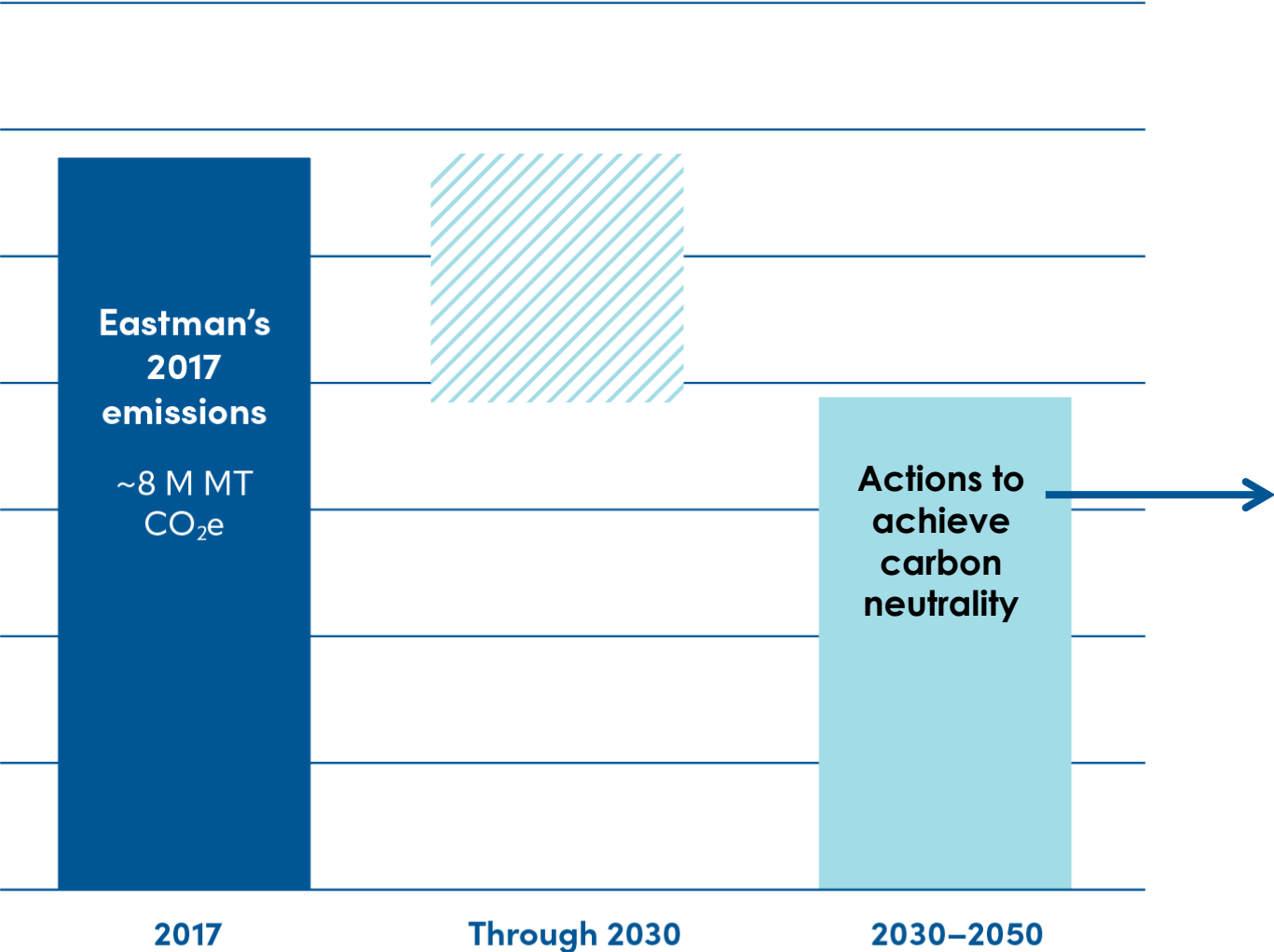


Renewable energy



Targeted process transformations

Driving initiatives now to achieve 2050 carbon neutrality



2030-2050 Portfolio of options:



Advanced waste heat recovery



Add clean hydrogen to feedstock and energy mix



Electrification for suitable process heat loads



Carbon capture and use



Small modular nuclear



Additional molecular recycling investments

Challenges and Headwinds to GHG Reduction Progress



Significant capital spend to maintain safe and reliable operations and meet GHG targets



Current technology readiness for lower-carbon options will not meet 2030 targets



Scope of projects require 3 or more years for implementation

Complicating factors



Regulatory mandate timelines are unknown



High thermal loads fostered existing use of CHP but decarbonization may force shift towards electrification



Reliability decline due to age of assets

The role played by energy efficiency

Decarbonization challenges scale with energy demands



Higher energy demands typically lead to more expensive equipment



Some larger-scale solutions may require infrastructure or fuel sources that aren't available yet



Commercialization of large, industrial decarbonization equipment may lag smaller (more common) sizes



Regulatory requirements may be partially tied to solution size



Life of existing assets may be extended at lower capacity utilization

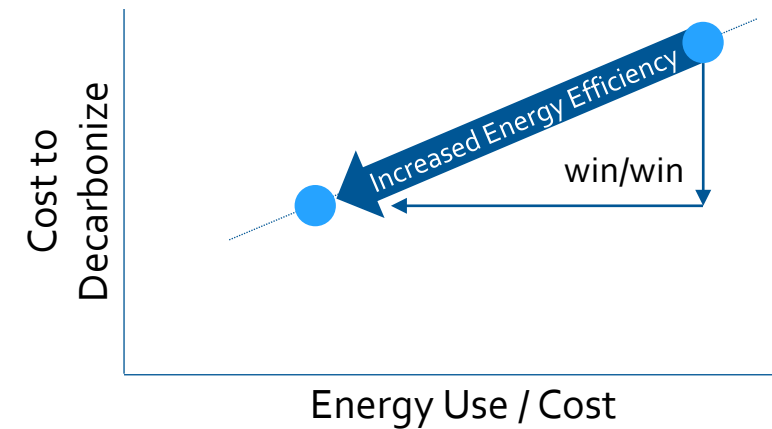


Optimizing energy efficiency of existing assets is a critical first step

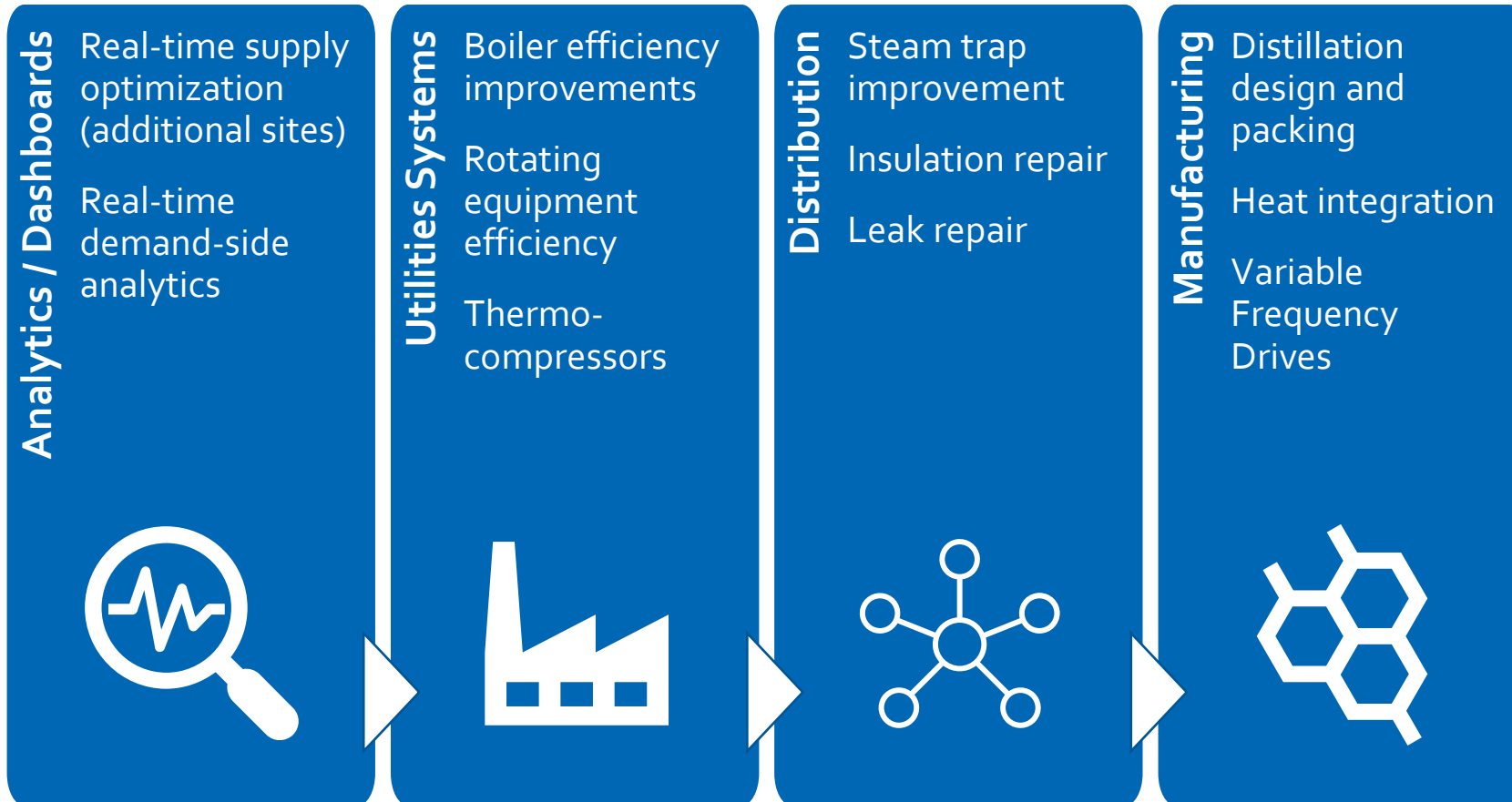
Lowering overall energy demand can lead to flexibility in the decarbonization solutions and strategy

Energy efficiency is the industry best-practice, first tier solution for addressing energy and emission targets

Energy efficiency is typically the lowest-cost decarbonization option



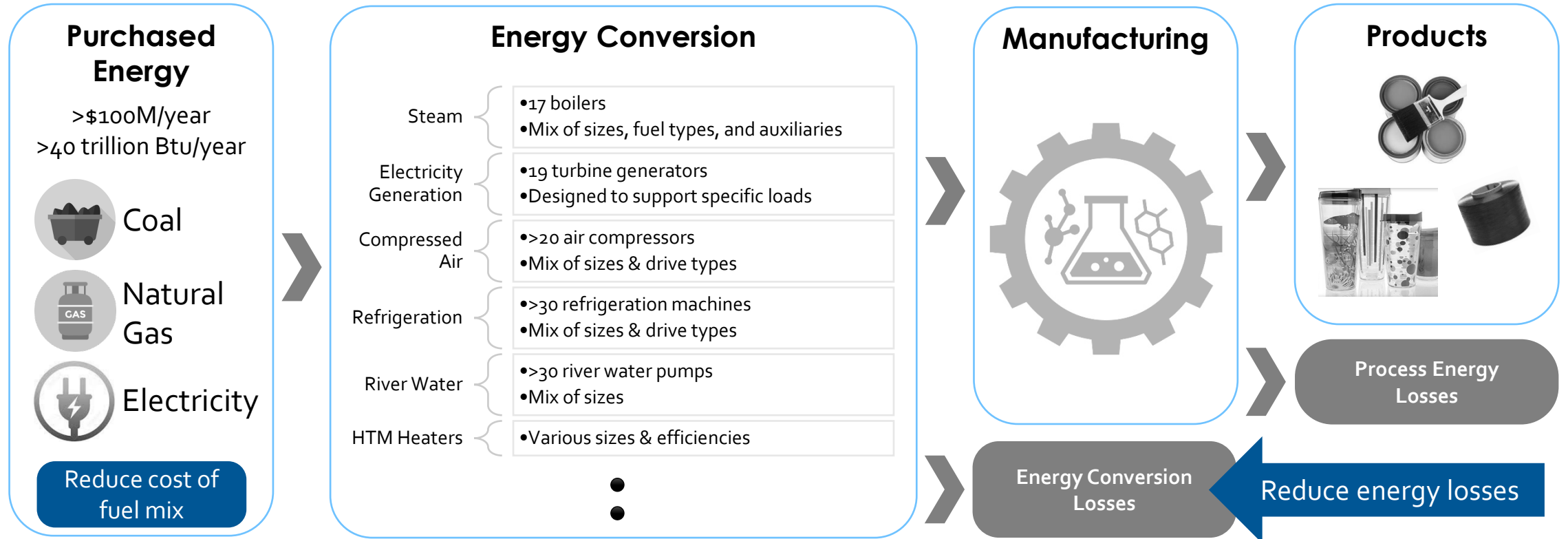
Example energy efficiency projects



Reduces cost to meet short-term and long-term decarbonization goals



Energy Cost Optimization (ECO) Model



Goal: Reduce the cost of energy by picking the best path for each btu

Eastman's Roadmap to Decarbonization

Competencies & Priorities



Innovation and investment to solve the triple challenge



Commitment and governance to decarbonize Eastman operations



Demonstrated energy efficiency focus

Enabling Progress on Goals



External Partnerships



Decarbonization roadmap with optionality to meet demands



Products & solutions to enable decarbonization beyond Eastman

EASTMAN

Questions?

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Fellow, Global Natural Resource Management
snolen@eastman.com





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