



# Progressing Energy Sustainability

*In a Time of Volatility*









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*Superior insights. Sustainable Solutions. Brighter Future.*

# Current Energy Sustainability Landscape

**A multitude of factors are driving major shifts in supply and demand that are impacting sustainability plans and executions.**

-  Climate change sense of urgency
-  Investor demands for climate-related disclosure
-  Extreme weather intensity and frequency
-  Supply chain, inflation, and international pressures
-  Increased competition and customer choice
-  Increased environmental policy and regulation



# Today's Renewable Energy Market: Shift from Linearity

**Sustainability prioritization and externalities have changed accessibility and market dynamics.**

## Historical Trends (Linear)

Increasingly accessible renewable energy resources with declining prices, low barriers to entry, stable energy market backdrop.

- ☑ Demand for resources readily met
- ☑ Market stability and predictability
- ☑ Increasing accessibility for renewable products
- ☑ Decreasing costs of assets due to increased suppliers, technology advancements and innovation

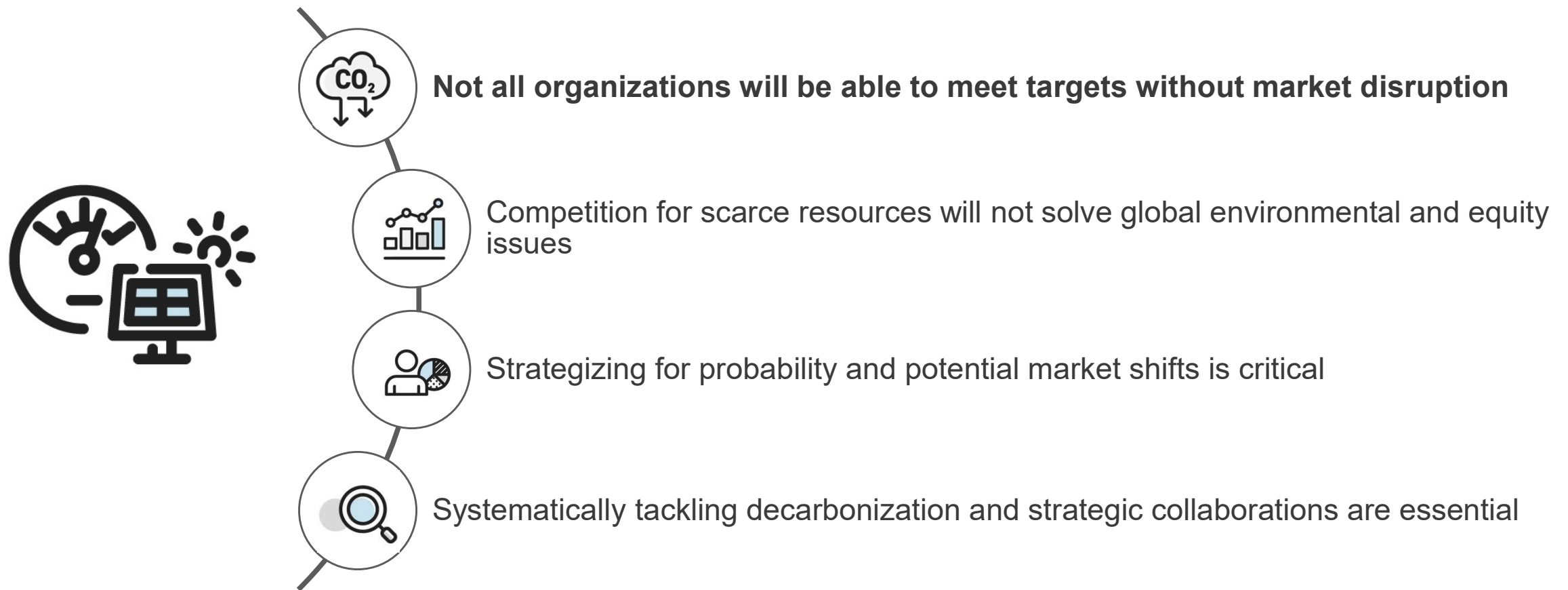
## Present Conditions (Non-Linear)

High demand, long interconnection timeframes and supply chain issues are creating uncertainty in the market and the ability to meet net-zero targets.

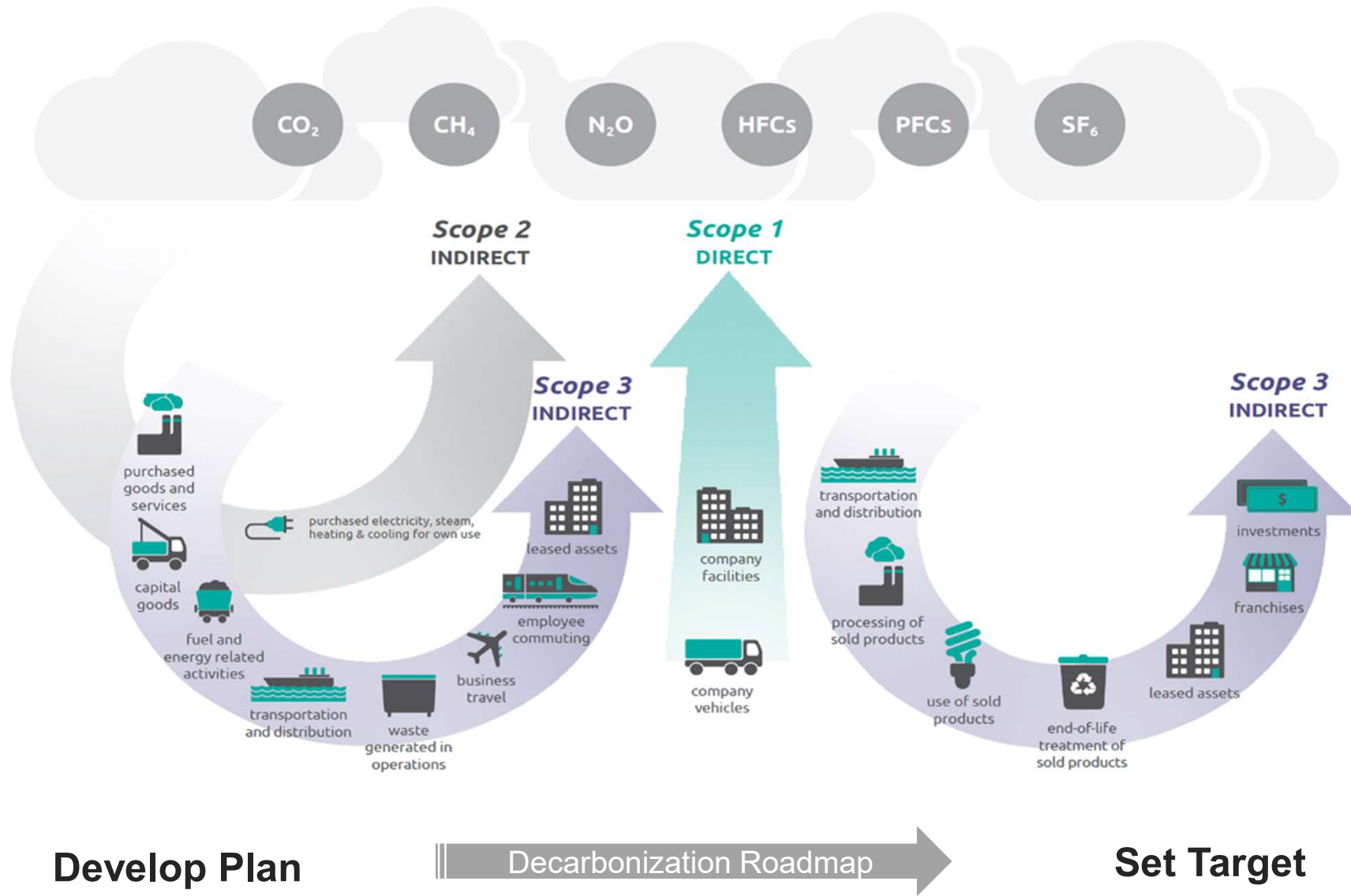
- ☑ Higher solar and wind raw material costs
- ☑ Supply chain, interconnection issues, tariff uncertainty
- ☑ Returns on capital increasing due to supply-demand rebalancing
- ☑ Energy market volatility challenges valuation and risk assessments

# Implications of the Current Market Dynamics

The current market is impacting feasibility and economic viability of renewable commitments.



# Decarbonization Planning Before Target Setting



Source: [EPA.gov](http://EPA.gov)

# Adapting to a Non-Linear Space - From Goals to Systems



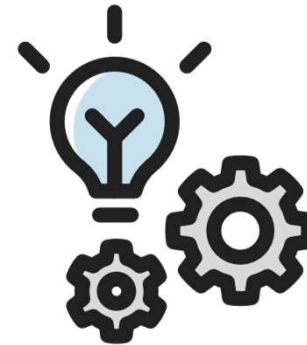
## Define

Strategic Principles,  
Objectives and  
Parameters



## Delineate

Planning Frameworks and  
Approaches



## Direct

Agile Execution, Feedback  
and Adjustment



## Disclose

Radical Transparency

# Define: Strategic Principles, Objectives and Parameters



## Strategic Priority Determination

Set out how to consider financial and environmental impacts, provide space for scenario planning and risk analysis, consider stakeholder perspectives, set relative values and priorities



## Energy Sustainability Definition

Consider strategy for abatement, offsets or additionality in defining objectives and develop point of view on internal cost on carbon



## Internal Alignment

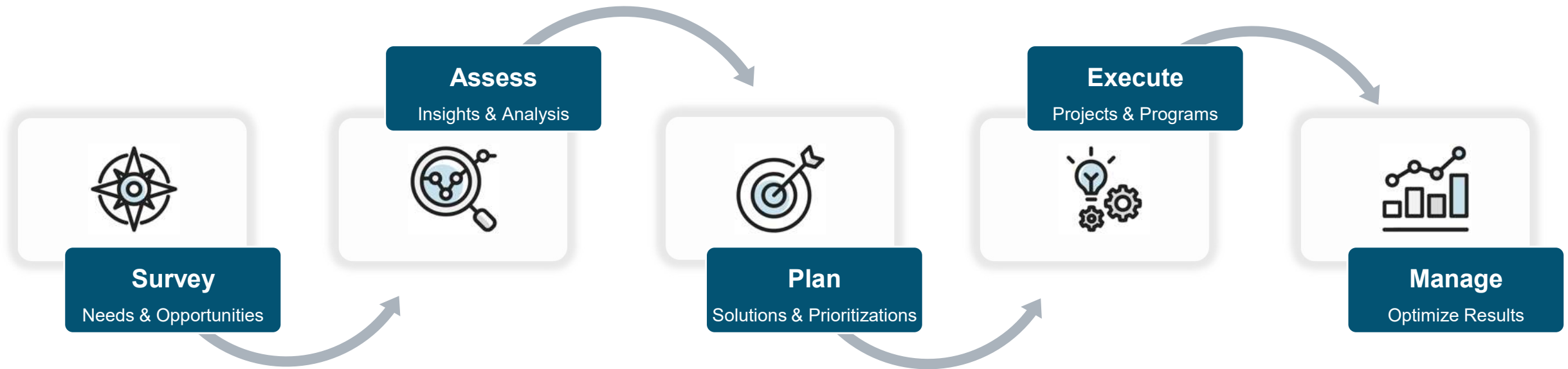
Generate buy-in and alignment of approach and values from multiple decisions makers (sustainability, finance, operations) and delegate authority to maximize adaptability, overcome inertia, and avoid second-guessing



## Strategic Approach

Determine the organizational readiness to tackle strategic objectives to decide if the organization will incrementally tackle projects, transform internally through building an organization or find a strategic partner.

# Delineate: Planning Frameworks and Approaches





# Carbon Abatement and Offset Solutions



## Energy Conservation Measures

Projects that reduce energy and demand consumption and associated cost

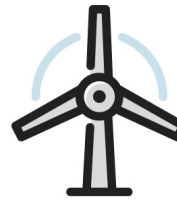
Scope 1 & 2 impact



## Onsite Renewables

Behind-the-meter renewable energy assets to offset all or a percentage of load

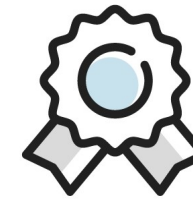
Scope 2 impact



## Offsite Renewables

Virtual purchased power agreements or integrated retail products

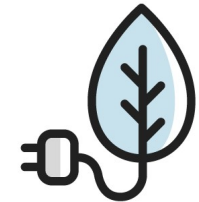
Scope 2 impact



## Renewable Energy Certificates & Offsets

Ability to claim carbon reduction through purchases of attributes and offsets

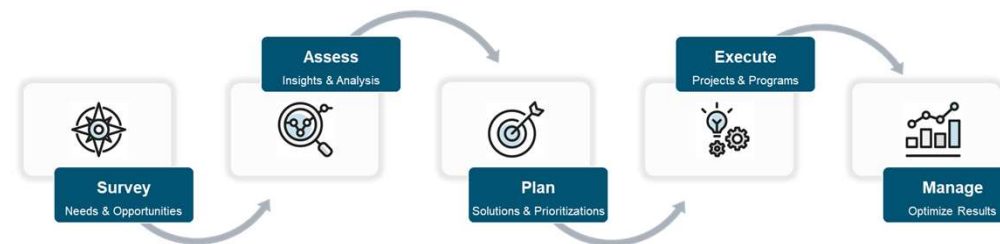
Scope 1 & 2 impact



## Electrification

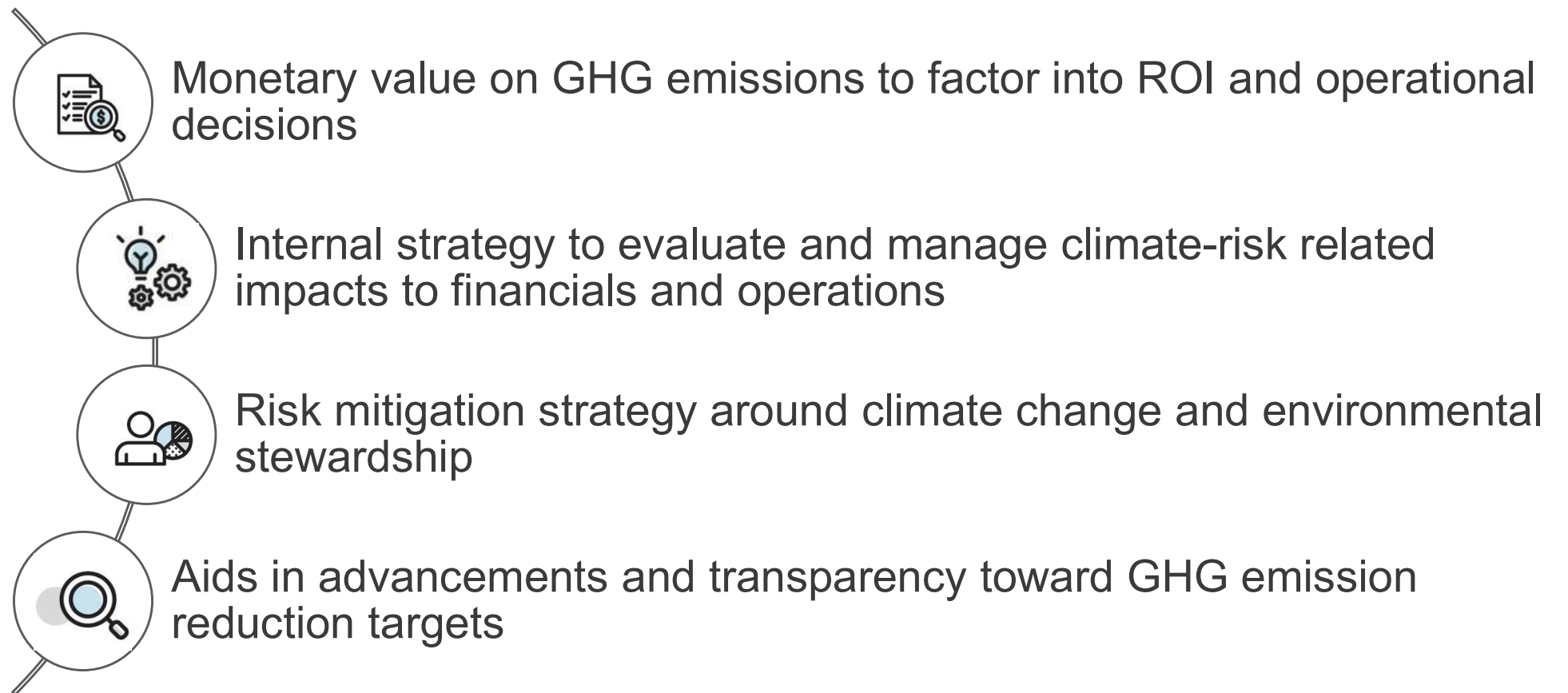
Beneficial or transportation electrification to reduce emissions

Scope 1 impact



# Putting a Value on Carbon to Evaluate Investments

Developing a carbon valuation standard and using it in ROI calculations for decision-making can help rationalize and unfreeze decision making.



# Energy Conservation Measures: Start Here

**Starting with energy conservation measures is a smart first step in reducing emissions.**

## Value

- 'Negative cost' carbon reduction
- Highest level and permanent impact with zero ambiguity
- Improved operations
- Intelligent management controls

## Challenge

- Overcoming organizational inertia
- Efficiently identifying & screening highest impact opportunities

## What's New and Notable in EE:

- Data analytics enables efficient & scalable identification and screening of potential EE operations
- Software & tech innovations drive improved controls & efficiency (including demand management opportunities)
- Waste heat recovery presents a promising efficiency option

# Onsite Renewable Energy

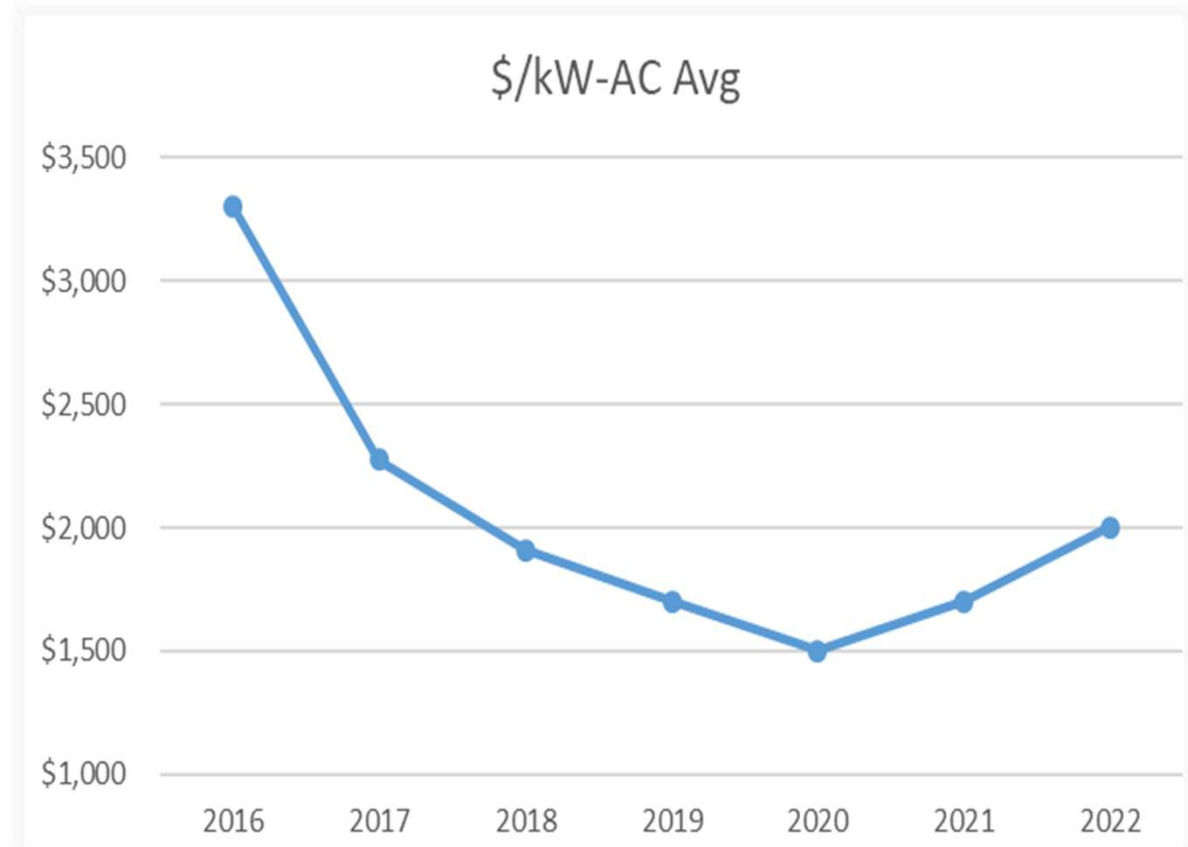
**Onsite renewable energy solutions can be a viable investment, but are highly location-dependent and prone to commercial faults.**

## Value

- Additive renewable resources where available
- Direct consumption of renewable energy production
- Revenue opportunity in favorable markets and environments

## Challenge

- Location and natural resource-dependent
- Unfavorable economics in low energy rate markets
- Proper sizing and configuration; ongoing O&M
- High demand, import tariffs



# Offsite Renewable Energy

**Offsite renewable energy procurement provides opportunity to sponsor new renewable energy investment at scale to meet emission reduction targets.**

## Value

- Long term, scalable solution with definitive impact
- Upfront investment not required
- Integrated products can operate seamlessly

## Challenge

- Lengthy contract agreements, locational considerations and market expertise needed
- Inherent risks depending on configuration
- Requires rigorous financial, accounting assessment

# Renewable Energy Certificates and Offsets

**RECs were once viewed as an easy offset solution for energy consumption, but the market is changing.**

## **Value**

- Fairly straightforward means to 'offset' carbon footprint
- Wide availability and low transaction costs

## **Challenge**

- Increased demand due to carbon reduction commitments  
leading to increasing price volatility
- Limited outlook for availability
- Dangers of the REC path
- No solid standards for offsets

# Electrification

**Compression electrification and transportation electrification are effective solutions, but economic viability and feasibility are key considerations.**

## Value

- Addresses (more difficult) Scope 1 emissions
- Reduced localized emissions (community impact), increased operational efficiency and reduction in maintenance costs

## Challenge

- Levelized cost of energy considerations and energy rate locational variability
- Charging infrastructure accessibility
- Incremental capital investment

# Sample Opportunity Assessment Report

A comprehensive opportunity assessment survey facilitates decision-making for different decarbonization measures across sites in a region, by filtering on Carbon impact, etc.

Region	Facility	Decarbonization Measures	Reduction Potential (% to baseline)	Reduction Potential (Mton CO <sup>2</sup> /yr.)	Cost of Carbon Reduction (\$/Mton)
USA Great Lakes	Manufacturing Site 1	ECM*	2%-5% Energy	90-200	(\$2-\$4)
		Electrification	Process Dependent	Process Dependent	(\$3) - \$15
		BTM Solar	Minor	Minor	-
		RECs	100% Electricity; 12% Energy	4400	\$2
		Offsite RE	100% Electricity; 12% Energy	4400	\$1
	Commercial Space 1	ECM	20%-25% Energy	80-100	(\$2-\$4)
		Electrification**	9% Energy	35	\$5
		BTM Solar	Up to and Over 100% Electricity; 50% Energy	400	\$4
		RECs**	100% Electricity; 50% Energy	400	\$2
		Offsite RE**	100% Electricity; 50% Energy	400	\$1

\*Focused on Machine Drive, HVAC, and Lighting \*\*Combining Offsite RE/RECs with Electrification would yield greater improvement



# **Direct: Agile Execution, Intensive Feedback, Continuous Adjustment**



## **Agile Execution**

Established frameworks, buy-in, and detailed planning supports high-speed, agile execution



## **Intensive Feedback**

Set up measurement, monitoring, and evaluation systems that provide a read of current conditions and 'real-time' results measured against established interpretive frameworks



## **Continuous Adjustment**

Adjust execution plans continuously based on feedback

## **Disclose: Radical Transparency**



Determine the best methods for how you will disclose and communicate



Report on milestones, met and unmet deliverables with transparent narrative



Disclose qualitative and quantitative data to provide transparency



Disclose tradeoffs, market anomalies and impacts from externalities



Provide information on emissions strategy, objectives and governance



Report on contingency plans and associated risks with emission targets

# Marketplace Offerings for Decarbonization



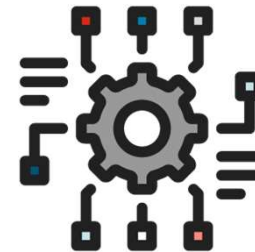
GHG Inventory,  
Reporting &  
Program Management



Decarbonization  
Roadmap & Strategy  
Development



Technical & Financial  
Assessment and  
Valuation



Turnkey Execution on  
Project Capital,  
Ownership, Operation  
and Market Integration



End-to-end Program  
Development &  
Implementation

# Navigating the New Carbon Economy

**Convert carbon from a liability to an asset by making strides toward decarbonization where possible and meet the challenge head-on through a strategic roadmap.**



Accept the new carbon economy and adapt



Develop a principle driven plan and evaluation framework prior to publishing goals



Define, Delineate, Direct, Disclose



# Thank you

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*Superior insights. Sustainable Solutions. Brighter Future.*

## Biographical Information



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Jamie Jankowski joined AEP Energy in 2012 and has extensive experience in all aspects of developing and delivering customer focused energy solutions. Jamie has led key customer engagements in delivering integrated renewable energy products and services. In his current role, Jamie has a passion developing energy and decarbonization strategies together with organizations, including integration of energy efficiency, energy supply, and onsite/offsite generation.

Jamie earned a Bachelor of Science in Mechanical Engineering from Rose-Hulman Institute of Technology and is a licensed Professional Engineer (PE) and Certified Energy Manager (CEM).

He serves in a volunteer leadership and board position as President of his local Association of Energy Engineers (AEE) chapter.